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Office of Legacy Management

2006 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites

December 2006

Work Performed by the S.M. Stoller Corporation under DOE Contract No. DE–AC01–02GJ79491
for the U.S. Department of Energy Office of Legacy Management.
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Acronyms

ACL	alternate concentration limit
BIA	Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
CA	Cooperative Agreement
CAA	Custodial Access Agreement
CFR	*Code of Federal Regulations*
COC	Constituent of Concern
DOE	U.S. Department of Energy
GCAP	Ground Water Compliance Action Plan
GPS	Global positioning system
LM	Office of Legacy Management
LTSP	Long-Term Surveillance Plan
MCL	maximum concentration limit
mg/L	milligram(s) per liter
MSL	mean sea level
NECA	Navajo Engineering and Construction Authority
NRC	U.S. Nuclear Regulatory Commission
PCB	polychlorinated biphenyl(s)
PL	photo location
POC	point of compliance
POE	point of exposure
TDS	total dissolved solids
UMTRCA	Uranium Mill Tailings Radiation Control Act of 1978 (88 USC 7901, *et seq*.)
USFS	U.S. Forest Service
USGS/NEIC	United States Geological Survey National Earthquake Information Center

Executive Summary

This report, in fulfillment of a license requirement, presents the results of long-term surveillance and maintenance activities conducted by the U.S. Department of Energy (DOE) Office of Legacy Management in 2006 at 19 uranium mill tailings disposal sites established under Title I of the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978[1]. These activities verified that the UMTRCA Title I disposal sites remain in compliance with license requirements.

DOE operates 18 UMTRCA Title I sites under a general license granted by the U.S. Nuclear Regulatory Commission in accordance with Title 10 *Code of Federal Regulations* Part 40.27. The Grand Junction, Colorado, Disposal Site, included in the list of 19 Title I sites, will not be included under the general license until an open, operating portion of the cell is filled and closed, which is projected to occur in 2023. This site is inspected in accordance with an interim long-term surveillance plan (LTSP).

Long-term surveillance and maintenance services for these disposal sites include inspecting and maintaining the sites; monitoring environmental media and institutional controls; conducting any necessary corrective actions; and performing administrative, records, stakeholder services, and other regulatory functions.

Annual site inspections and monitoring are conducted in accordance with site-specific LTSPs and procedures established by DOE to comply with license requirements. Each site inspection is performed to verify the integrity of visible features at the site; to identify changes or new conditions that may affect the long-term performance of the site; and to determine the need, if any, for maintenance, follow-up or contingency inspections, or corrective action. LTSPs and site compliance reports are available on the Internet at **www.lm.doe.gov/**.

All of the sites require some degree of routine monitoring and maintenance which may include ground water and surface water monitoring, minor erosion control, vegetation and noxious weed control, fence and gate repairs, sign replacement, and minor trash removal. The following nonroutine activities[2] occurred in 2006:

- Ambrosia Lake, New Mexico—access road temporarily realigned to bypass a Rio Algom Mining, LLC waste haul road;
- Burrell, Pennsylvania—DOE coordinated with State wildlife officials to remove beavers and breach the dam that was backing water up against the disposal cell;
- Canonsburg, Pennsylvania— stakeholders and regulators approved stream bank stabilization proposed and conducted by the Borough of Canonsburg;
- Canonsburg, Pennsylvania—sale of Area C property in the southeastern corner of the site was completed;
- Canonsburg, Pennsylvania—monitoring program modifications included in the revised LTSP were conditionally concurred in by NRC with one additional requirement; continued monitoring for manganese in ground water at well MW–412 and surface water at location SW–602;

[1] Congress directed that the Moab, Utah, processing site be remediated under Title I of UMTRCA. This site eventually will become the twentieth Title I disposal site.
[2] Nonroutine activities are activities implemented in response to changes in site conditions, regulatory setting, or management structure following a regulatory compliance review.

- Durango, Colorado—LTSP criteria for permanent closure of the collection and treatment system were met and a plan for decommissioning the collection drain, the permeable reactive barrier, and the retention pond has been drafted;
- Falls City, Texas—LTSP required 5-year ground water monitoring program evaluation was completed and recommended modifications to ground water monitoring program were incorporated into a revised draft LTSP; planned for NRC submittal in early 2007;
- Gunnison, Colorado—BLM approval received to terminate the right-of-way reservation permit for the reseeded areas along the former reclaimed Chance Gulch haul road;
- Lakeview, Oregon—continued evaluation to determine the effects of deep-rooted vegetation on cell performance;
- Lakeview, Oregon—continued riprap gradation monitoring to ensure compliance with minimum rock size requirement for disposal cell erosion protection;
- Lowman, Idaho—remaining ground water monitoring wells at the site were decommissioned;
- Maybell, Colorado—remaining ground water monitoring wells at the site were decommissioned;
- Mexican Hat—An evaluation of the seep-monitoring program was conducted and recommendations to discontinue water quality monitoring and to continue annual observations of flows were conditionally concurred in by the Navajo Nation; NRC approval pending;
- Mexican Hat—Navajo Nation concurrence received to decommission the remaining ground water monitoring wells at the site;
- Naturita, Colorado—LTSP required five-year monitoring program evaluation recommended discontinuing ground water monitoring and is pending NRC concurrence;
- Rifle, Colorado—land survey of eight settlement plates and three standpipes determined no down gradient movement of the cell is occurring;
- Salt Lake City, Utah—Energy Solutions and DOE signed a license agreement that primarily covers site access;
- Salt Lake City, Utah—on site scanning for spillover and windblown radioactive contamination from adjacent ongoing radioactive waste disposal activities found all measurements below DOE Radcon Manual limits;
- Shiprock, New Mexico—ongoing study to determine the effect of plant encroachment on the disposal cell and to evaluate the need for continued vegetation control;
- Shiprock, New Mexico—continued research associated with cell performance and the collection of saturated hydraulic conductivity measurements;
- Shiprock, New Mexico—phytoremediation test plots constructed to research the effectiveness of using phreatophytes for removing site legacy ground water contamination;
- Slick Rock, Colorado—BLM determined revegetation of the former spoils pile and staging area was successful and closed the right-of-way reservation permit;
- Tuba City, Arizona—evaluation to determine whether to remove two inactive evaporation ponds.

Results of the annual site inspection, maintenance, and monitoring activities are reported in the site-specific chapters that follow. Significant actions and issues at each site are summarized in the following table, which includes an index number for each item that can be found in the left margin next to the corresponding text in the respective site chapter.

2006 Summary of UMTRCA Title I Site Actions and Issues

Site	Chapter	Page	Index No.	Actions and Issues
Ambrosia Lake, New Mexico	1	1–2	1A	Access road temporarily realigned to bypass a Rio Algom Mining, LLC waste haul road.
		1–5	1B	Maintenance: control of deep-rooted vegetation on cell cover.
		1–5	1C	Maintenance: control of undesirable vegetation (tamarisk) on site.
		1–6	1D	Surveyed elevations of the disposal cell settlement plates to verify stability of cover repair.
Burrell, Pennsylvania	2	2–2	2A	Maintenance: access road repair.
		2–2	2B	Maintenance: security fence repairs.
		2–2	2C	Maintenance: entrance sign replaced.
		2–5	2D	Coordinated with State to relocate beavers and remove dam.
		2–6	2E	Maintenance: control of undesirable and invasive vegetation.
		2–6	2F	Maintenance: control of noxious weeds.
Canonsburg, Pennsylvania	3	3–2	3A	Replaced pad lock on security fence gate.
		3–5	3B	Maintenance: control of noxious weeds on site.
		3–6	3C	Maintenance: control of undesirable plants and noxious weeds along perimeter fence.
		3–6	3D	Stream bank stabilization by the Borough of Canonsburg.
		3–7	3E	Area C property sale complete.
		3–8	3F	Ground water monitoring.
		3–11	3G	NRC conditional concurrence to monitoring program modifications included in the revised LTSP was received.
Durango, Colorado	4	4–2	4A	Maintenance: replaced illegible entrance sign, missing perimeter sign will not be replaced again.
		4–5	4B	Maintenance: vegetation control on side slopes of the cell.
		4–6	4C	Criteria met for closure of the cell transient drainage collection and treatment system plan for system decommissioning drafted.
		4–7	4D	Maintenance: control of noxious weeds.
		4–7	4E	Ground water monitoring.
Falls City, Texas	5	5–2	5A	Maintenance: replaced the entrance gate, perimeter fence, and two missing perimeter signs.
		5–2	5B	Maintenance: vegetation control on cell.
		5–5	5C	Aggregate ramp installed to access the cell top.
		5–7	5D	Ground water monitoring.
		5–14	5E	LTSP required 5-year ground water monitoring program evaluation completed; drafted a revised LTSP to incorporate recommendations.
Grand Junction, Colorado	6	6–5	6A	Maintenance: replaced perimeter and warning signs.
		6–6	6B	Maintenance: vegetation control on the cell.
		6–6	6C	Maintenance: additional work performed to the east storm water retention pond to prevent overflow onto the adjacent road.
		6–7	6D	Maintenance: control of undesirable and invasive vegetation.
		6–8	6E	Ground water monitoring.
Green River, Utah	7	7–6	7A	Ground water monitoring.
		7–7	7B	Ground water ACLs proposed to NRC and the State of Utah in the revised GCAP (Subpart B compliance strategy).
Gunnison, Colorado	8	8–2	8A	Vandalism: missing entrance sign and missing and damaged perimeter signs were replaced.
		8–6	8B	Successful revegetation: BLM approval to terminate ROW permit.
		8–7	8C	Ground water monitoring.
Lakeview, Oregon	9	9–5	9A	Evaluation of effects of deep-rooted vegetation on cell performance.
		9–7	9B	Revised LTSP remains pending NRC concurrence; includes recalculated minimum required riprap size.
		9–7	9C	Riprap gradation monitoring.
Lowman, Idaho	10	10–2	10A	Maintenance: vegetation cut obstructing view of signs.
		10–2	10B	Maintenance: vegetation cut obstructing view of site marker.
		10–2	10C	Ground water monitoring wells were decommissioned.
		10–5	10D	Maintenance: control of noxious weeds.
Maybell, Colorado	11	11–5	11A	Monitoring wells decommissioned.
		11–6	11B	Uranium exploration claims found staked onsite.
		11–8	11C	Fenced-in successfully revegetated former BLM right-of-way permit area being licensed for reuse as livestock management area.

Site	Chapter	Page	Index No.	Actions and Issues
Mexican Hat, Utah	12	12–2	12A	Maintenance: repaired perimeter fence.
		12–2	12B	Maintenance: repaired and relocated perimeter sign.
		12–2	12C	Maintenance: repaired boundary monument.
		12–5	12D	Maintenance: control of undesirable plants.
		12–6	12E	Concurrence to decommission ground water monitor wells received.
		12–7	12F	Seeps water quality monitoring discontinued; annual observation of seeps flow continues.
Naturita, Colorado	13	13–5	13A	Maintenance: control of noxious weeds.
		13–7	13B	LTSP required 5-year ground water monitoring program evaluation recommended discontinuing ground water monitoring; NRC concurrence pending.
Rifle, Colorado	14	14–2	14A	Maintenance: debris removed from the access road.
		14–2	14B	Maintenance: entrance sign replaced.
		14–6	14C	Maintenance: control of noxious weeds.
		14–7	14D	Disposal cell pore water level monitoring.
		14–8	14E	Continued cell dewatering.
Salt Lake City, Utah	15	15–2	15A	Perpetual site access and controlled access across restricted areas.
		15–5	15B	Energy Solutions and DOE signed a license agreement that primarily covers site access.
		15–5	15C	Clean up of radiological surface contamination resulting from activity on an adjacent Envirocare waste haul road.
		15–5	15D	On site scanning for spillover and windblown radioactive contamination found all measurements below DOE limits.
Shiprock, New Mexico	16	16–2	16A	Maintenance: removed accumulated weeds and trash.
		16–2	16B	Maintenance: gaps beneath the perimeter fence filled in with rock.
		16–6	16C	Research: ongoing study to determine the need for continued vegetation control on cell.
		16–6	16D	Research: collection of saturated hydraulic conductivity measurements to evaluate cell performance.
		16–6	16E	Research: phytoremediation test plots constructed.
Slick Rock, Colorado	17	17–5	17A	Maintenance: control of noxious and invasive weeds.
		17–5	17B	Reclamation: BLM determined revegetation of the former spoils pile and staging area successful and closed the Right-of-Way Reservation permit.
		17–6	17C	New uranium exploration drill hole was found just outside property boundary.
Spook, Wyoming	18	18–2	18A	Maintenance: concrete base of site marker needs additional repair.
Tuba City, Arizona	19	19–2	19A	Maintenance: gaps beneath the fence filled and top rail repaired.
		19–5	19B	Maintenance: control of deep-rooted plants on cell.
		19–5	19C	Monitor and evaluate vegetation encroachment and sand accretion on cell.
		19–6	19D	Evaluate whether to remove two inactive evaporation ponds.
		19–7	19E	Ground water monitoring.

1.0 Ambrosia Lake, New Mexico, Disposal Site

1.1 Compliance Summary

The Ambrosia Lake, New Mexico, Disposal Site was inspected on August 30, 2006, and was in excellent condition. Repairs made in 2005 to a small depression on the cell cover were in excellent condition. Undesirable vegetation found growing on the disposal cell cover and at the base of the disposal cell adjacent to the site entrance were cut and treated with herbicide. The site access road, owned by Rio Algom Mining, LLC, was temporarily realigned to allow for construction of a waste haul road. No cause for a follow-up or contingency inspection was identified.

1.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Ambrosia Lake, New Mexico, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Ambrosia Lake, New Mexico, Disposal Site* (DOE/AL/62350–211, Rev. 1, U.S. Department of Energy [DOE], Albuquerque Operations Office, July 1996) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 1–1.

Table 1-1. License Requirements for the Ambrosia Lake, New Mexico, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 1.3.1
Follow-up or Contingency Inspections	Sections 6.0 and 7.0	Section 1.3.2
Routine Maintenance and Repairs	Section 8.0	Section 1.3.3
Ground Water Monitoring	Section 5.0	Section 1.3.4
Corrective Action	Section 9.0	Section 1.3.6

Institutional Controls—The 356-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1998. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site access road. Verification of these institutional controls is part of the annual inspection.

1.3 Compliance Review

1.3.1 Annual Inspection and Report

The disposal site, located north of Grants, New Mexico, was inspected on August 30, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 1–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

1.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Sign, and Perimeter Signs—Access to the Ambrosia Lake Disposal Site is along a gravel road that leads to the site for approximately 1 mile from New Mexico State Highway 509. There is a locked gate across this road where it leaves Highway 509 because the road continues to private mining and grazing interests that lie east of the site. Numerous locks are connected in series to allow other users passage through the gate. The access road continues through the DOE-owned property along the south boundary of the site.

1A Rio Algom Mining, LLC, has temporarily realigned the access road to bypass a new waste haul road. The access road will be returned to the previous configuration once waste hauling operations are complete.

The entrance sign and all perimeter signs were in good condition. Posts for perimeter signs P1 through P15 include mining restriction area warning signs (PL–1).

Site Markers, Survey and Boundary Monuments—The two granite site markers, three combined survey and boundary monuments, and five additional boundary monuments were all undisturbed and in excellent condition.

Monitor Wells—Two monitor wells (MW–0675 and MW–0678) are present and in good condition. Ground water monitoring is performed once every three years.

Mine Vents—Two mine vent shafts, associated with abandoned underground mines, are within the site boundary. The mine vent north of the disposal cell has a spot-welded cover, and the other vent located near the southwest corner of the cell has a bolted-on cover. All vents were secure at the time of the inspection.

1.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the riprap-covered top of the disposal cell; (2) the riprap-covered side slopes and apron of the cell; (3) the graded and revegetated area between the disposal cell and the site perimeter; and (4) the outlying area.

Within each transect, inspectors examined specific site surveillance features, such as survey and boundary monuments, signs, and site markers. Inspectors examined each transect for evidence of erosion, settling, slumping, or other disturbance that might affect site integrity or the long-term performance of the site.

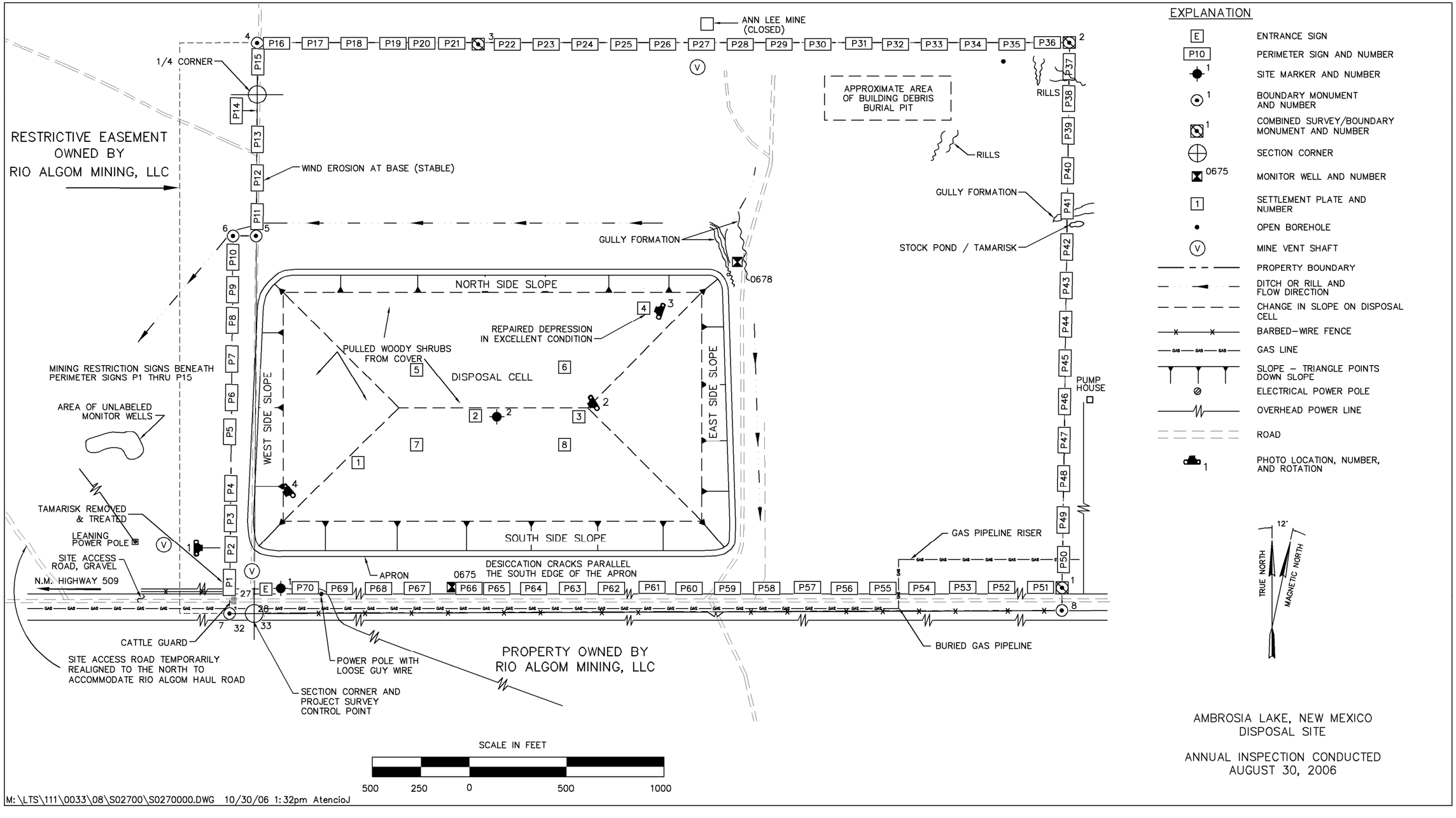


Figure 1–1. 2006 Annual Compliance Drawing for the Ambrosia Lake, New Mexico, Disposal Site

Top of Disposal Cell—The disposal cell was completed in 1994. The basalt riprap-covered top of the disposal cell is in excellent condition (PL–2). There was no evidence of cracking, settling, slumping, or erosion. Repairs were made in August 2005 to a shallow depression in the cell cover around settlement plate SP–4; the repaired area was in good condition (PL–3).

1B Scattered annual weeds and clumps of grass were observed growing on the disposal cell cover and are insignificant. Deep-rooted woody shrubs, potentially damaging to the radon barrier, were also noted on the disposal cell cover and removed during the inspection.

Side Slopes and Apron—The basalt riprap-covered side slopes and apron were in excellent condition and showed no evidence of cracking, settling, slumping, or erosion. Desiccation cracks occur in the clay-rich backfill soil parallel to the apron along the south side of the cell. The cracks do not pose a threat to the disposal cell.

Graded and Revegetated Site Area—In general, site vegetation was healthier and better established than vegetation in the surrounding areas. Some areas were windswept with little growth, while other areas had excellent coverage. There was evidence of cattle grazing adjacent to the disposal cell and in the outlying portions of the DOE property. Grazing in the revegetated areas of the site has not been a problem. There was no evidence of vehicular trespassing at the site.

Rills and gullies within the DOE property north and east of the disposal cell have been monitored for several years. Recent erosion activity was noted in several of the rills and gullies; however, these erosional features do not present a threat to the performance or integrity of the disposal cell. The features are sufficient distances from the disposal cell, with headward erosion occurring away from the cell and no significant sedimentation.

The access road and a power line cross the site near and parallel to the southern boundary of the site. In addition, there is a gas pipeline riser in the southeastern part of the site. This riser is associated with a buried gas pipeline along the south edge of the site. No changes or disturbances associated with these features were observed.

Tamarisk, an undesirable deep-rooted shrub, is usually found along the south apron of the
1C disposal cell. The plants are cut and treated when found. None were present along the apron in 2006. However, a plant was growing near perimeter sign P1 and was cut and treated with herbicide.

Outlying Area—The area within 0.25 mile of the site boundary was inspected and the only apparent change was the realignment of the access road and the construction of a waste haul road. There was no activity identified that would impact the site.

Construction of a haul road by Rio Algom Mining, LLC to transport radioactive materials from decommissioned evaporation ponds located southwest of the site to their UMTRCA Title II disposal cell located west of the site across Highway 509 was completed in 2006. This included the construction of a bridge over Highway 509 to minimize impacts to the state highway and to manage Department of Transportation requirements. Waste hauling operations were being performed at the time of the inspection (PL–4) and are expected to be complete by 2007.

Temporary realignment of the site access road across Rio Algom property west of the site was required to accommodate construction of the waste haul road. Rio Algom will remove and reclaim the haul road once waste hauling operations are complete, and return the site access road to its former configuration. These activities are not expected to impact the performance of the Ambrosia Lake Disposal Site.

1.3.2 Follow-up Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed. No follow-up inspections were required in 2006.

No follow-up or contingency inspections were required in 2006.

1.3.3 Routine Maintenance and Repairs

Undesirable plants were removed from the cell cover and near perimeter sign P1 in 2006.

1.3.4 Ground Water Monitoring

In accordance with the LTSP, ground water monitoring is not required at this site because (1) the ground water is heavily contaminated from underground uranium mining and naturally occurring mineralization, and (2) the uppermost aquifer is of limited use due to its low yield. Consequently, the NRC concurred in the application of supplemental standards at the site and the exemption of both compliance and performance ground water monitoring. However, at the request of the New Mexico Environment Department, DOE conducts limited monitoring at two locations as a best management practice. Monitor well MW−0675 is completed in the alluvium, and monitor well MW−0678 is completed in the uppermost sandstone unit. DOE will sample these locations once every third year (the initial post-closure sampling event was in December 2001), for up to 30 years, and will evaluate the results after every third sampling event. The samples are analyzed for molybdenum, nitrate, selenium, sulfate, and uranium. The next sampling event is scheduled for fall 2007.

1.3.5 Settlement Plate Monitoring

The main tailings pile at the Ambrosia Lake Site was stabilized in place. Relocated contaminated materials (soil and debris) were placed on top of the tailings and covered with a radon/infiltration barrier. The top slopes and side slopes of the disposal cell were capped with rock to prevent wind and water erosion of the underlying radon/infiltration barrier and tailings. The stabilized disposal cell was constructed above the ground surface.

The tailings and contaminated materials were compacted before the radon barrier was completed; however, further consolidation was expected. Therefore, eight settlement plates (referred to as displacement monuments in the LTSP) were installed on the top of the disposal cell to monitor the anticipated settlement of the tailings embankment during placement of contaminated materials and the disposal cell cover. The settlement plates were installed at various depths according to specifications. The LTSP does not require monitoring of the settlement plates

during routine annual inspections, but rather they be used to measure significant long-term settlement of the disposal cell.

1D A shallow depression around settlement plate SP–4, near the northeast corner of the disposal cell cover, was first noted during the 1997 inspection and continued to grow in depth and area in subsequent years. The depression was repaired in August 2005. Surveys of the eight settlement plates in September 2005 and September 2006 indicate that the cover is stable and no new settling has occurred at SP–4. One more post-repair survey is planned for 2007. After that survey, settlement plate surveys will be conducted only if visual inspections indicate significant settlement on the disposal cell top.

1.3.6 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

1.3.7 Photographs

Table 1-2. Photographs Taken at the Ambrosia Lake, New Mexico, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	90	Perimeter sign P2 with the restrictive easement warning sign below.
PL–2	240	View of the disposal cell top from settlement plate SP–3.
PL–3	290	Repaired settlement area surrounding settlement plate SP–4.
PL–4	230	Loaded haul truck crossing recently constructed Rio Algom haul road bridge over Highway 509.

AMB 8/2006. PL–1. Perimeter sign P2 with the restrictive easement warning sign below.

AMB 8/2006. PL–2. View of the disposal cell top from settlement plate SP–3.

AMB 8/2006. PL–3 Repaired settlement area surrounding settlement plate SP–4.

AMB 8/2006. PL–4 Loaded haul truck crossing recently constructed Rio Algom haul road bridge over Highway 509.

End of current section.

2.0 Burrell, Pennsylvania, Disposal Site

2.1 Compliance Summary

The Burrell Disposal Site, inspected on September 19, 2006, was in excellent condition. The disposal cell, its cover, and associated drainage features are performing as designed. The missing entrance sign was replaced. Several strands of barbed wire were found broken and need repair. Beaver dams were removed in November 2005 and have not reestablished. Control of undesirable vegetation and noxious weeds continued at the site. Ground water monitoring is required every 5-years and was not performed in 2006; the last monitoring in 2004 indicated there is no contamination being released and that the disposal cell is performing as designed. No requirement for a follow-up or contingency inspection was identified.

2.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Burrell, Pennsylvania, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the U.S. Department of Energy Burrell Vicinity Property, Blairsville, Pennsylvania* (GJO−2002−331−TAR, U.S. Department of Energy [DOE] Grand Junction, Colorado, April 2000) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 2–1.

Table 2–1. License Requirements for the Burrell, Pennsylvania, Disposal Site

Requirement	Long Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.3	Section 2.3.1
Follow-up or Contingency Inspections	Section 3.5	Section 2.3.2
Routine Maintenance and Repairs	Section 3.6	Section 2.3.3
Ground Water Monitoring	Section 3.7	Section 2.3.4
Corrective Action	Section 3.6.3	Section 2.3.5

Institutional Controls—The 72-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1994. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and locked gates. Verification of these institutional controls is part of the annual inspection.

2.3 Compliance Review

2.3.1 Annual Inspection and Report

The site, located southeast of Blairsville, Pennsylvania, was inspected on September 19, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 2−1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

2.3.1.1 Specific Site Surveillance Features

Site Access, Fence, Gates, and Signs—Access to the site is off Strangford Road on a site access road within a perpetual right-of-way through private property (Tract 201−E) and across DOE leased land crossing the Norfolk Southern Railroad tracks. The access road leads from the railroad track crossing to the entrance gate in the east end of the chain-link site security fence. During the inspection, a railroad crew was observed performing maintenance on the hard-
2A packed, gravel road where potholes and depressions as deep as 6-8 inches had developed. Road damage is apparently due to frequent use by railroad and gas company vehicles and local residents.

Historically the area along the DOE right-of-way has been used for unpermitted dumping, hunting, target practice, and riding of all-terrain vehicles. DOE had attempted to control access across the right-of-way by maintaining a gate at Strangford Road and installing guardrails on each side of the gate. As a result of local complaints that the guardrails blocked parking areas, DOE removed several sections. Following years of replacing locks and the gate being damaged beyond repair in 2002, DOE received NRC concurrence and removed the gate at Strangford Road in 2003. Institutional control for the site is now established at the entrance gate in the security fence. The entrance gate (on the east end of the security fence) and the personnel gate (on the west end of the security fence) were in good condition at the time of the inspection.

2B Overall, the security fence was in good condition at the time of the inspection. Several strands of barbed wire were found broken along the south fence line and need repair (PL–1). DOE replaced the fabric on the south panel of the security fence after a maintenance contractor found it damaged.

In 2006, most of the perimeter signs were in serviceable to excellent condition. Bullet holes occur in several of the signs, but they remain legible. The perimeter signs attached to the northern perimeter fence (P1 through P8) are subject to periodic maintenance and replacement because of the significant amount of public activity in this area. The entrance sign found missing
2C in 2005 was replaced with a perimeter sign, with DOE contact information added; the sign was mounted on the entrance gate. DOE inspectors installed a standard entrance sign in 2006.

Site Markers and Monuments—There is only one site marker (SMK–1) at the site that is located at the east end of the site near the entrance gate. The site marker was in excellent condition. Vegetation around the site marker is cleared annually.

The site has seven boundary monuments and three survey monuments. Because of dense vegetation and soil accumulation, several of the monuments typically are difficult to locate. However, all of the monuments were found and were in good condition.

Four pairs of erosion control markers are located in dense stands of vegetation, where they often are difficult to find. In 2006, all erosion control markers were located, inspected, and found to be in good condition. There was no sign of erosion at the site.

Monitor Wells—The site has four pairs of monitor wells, with a shallow (alluvial) completion and deeper (bedrock) completion well in each pair. New submersible bladder pumps were installed in all eight wells in fall 2004. Corridors to the wells are mowed annually to maintain access to and provide working space around the wells. All monitor wells were secure and in good condition.

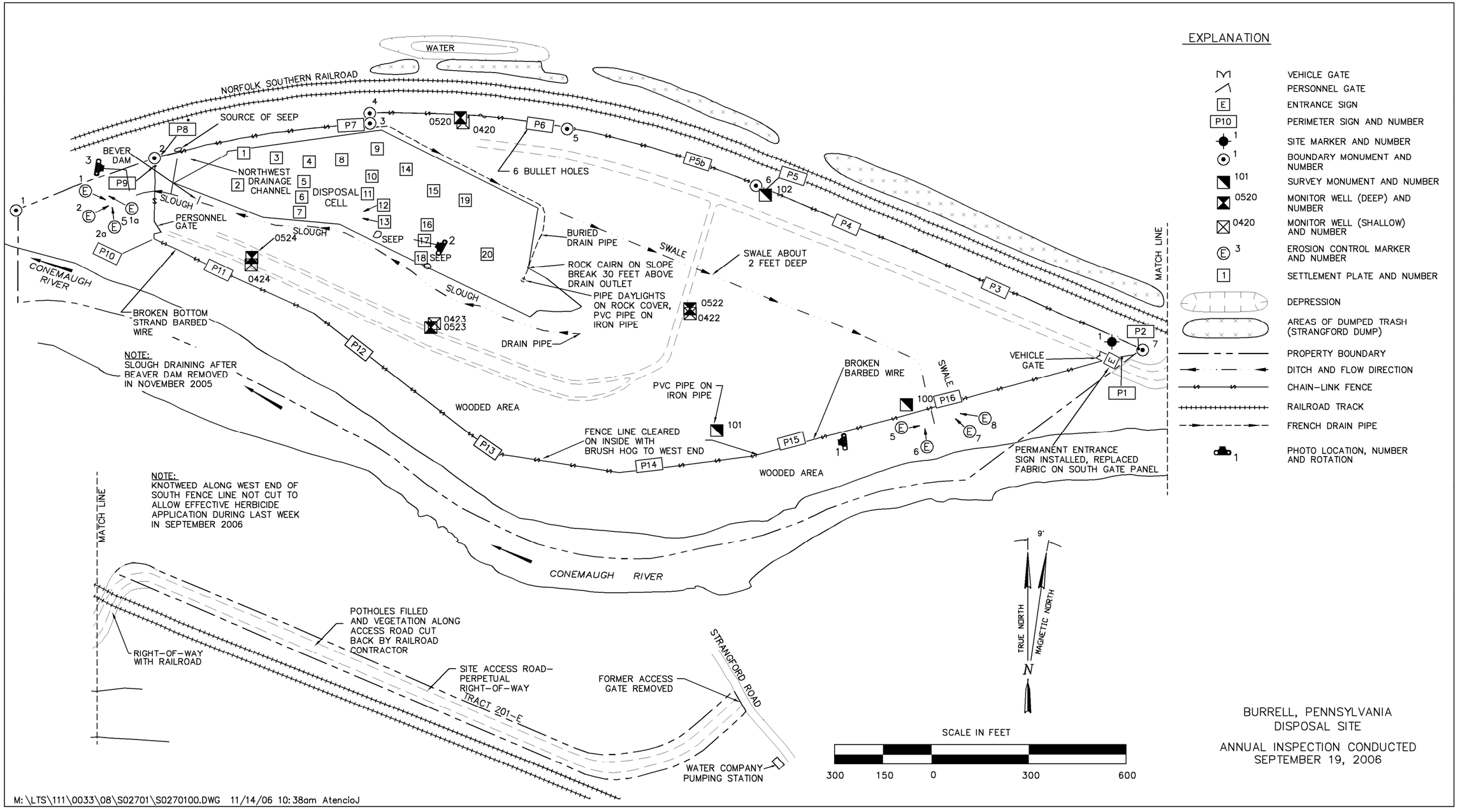


Figure 2–1. 2006 Annual Compliance Drawing for the Burrell, Pennsylvania, Disposal Site

2.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the disposal cell; (2) the area between the disposal cell and site boundary; (3) the site perimeter; and (4) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Disposal Cell—The top and side slopes of the disposal cell are covered with riprap and were in excellent condition. There was no evidence of settling, slumping, or other indications of instability. Rock quality was excellent; degradation of the limestone riprap was not evident.

Trees and shrubs continue to establish in the riprap (PL–2), as vegetation eradication is no longer a requirement of the LTSP. A study that evaluated risks posed by encroachment of plants on the disposal cell demonstrated that the plants will not degrade the long-term performance of the cell and may improve performance by reducing moisture in the cover through evapotranspiration. The study concluded that plant growth on the cell poses no added public or environmental risk of exposure to contaminants within the disposal cell because the cell contains only 4 curies of radium-226 and the hazardous constituents are not leachable, even if infiltration occurs. These studies further concluded that plant growth would not be detrimental to the proper functioning of the radon barrier. Because vegetation grows so vigorously at this site, effective vegetation control on the cell cover would require an aggressive program entailing, at a minimum, an annual application of herbicides. The potential environmental and health risks associated with such a program are greater than risks resulting from allowing vegetation to establish naturally. The LTSP was revised (April 2000) to allow vegetation to grow on the disposal cell without further intervention; stating that such growth will not increase risk to public health, safety, or the environment. In their concurrence of the of the revised LTSP, the U.S. Nuclear Regulatory Commission suggested that DOE reevaluate the effects of vegetation on cover performance in 10 or 20 years to confirm performance parameters and predictions.

A perforated pipe and rock-filled trench drain were installed along the base of the north side slope of the disposal cell in August 1998 to prevent ponding in that area and to intercept water that was suspected to be flowing under to cell and emerging as seeps along the south side of the cell. At the time of the 2006 inspection, the area along the drain was dry and no water was flowing from the outlet. The wire hardware cloth was intact in the drain outlet. Water never has been observed flowing from the outlet since the system was installed, perhaps because the material through which the trench passes absorbs water. Much of the material on this site is imported fill and debris and is expected to be permeable.

In 2005, inspectors found that the slough along the south side of the disposal cell, fed by ground water, had backed up as a result of a beaver dam on the slough west of the site boundary. The dam caused water to back up half way up the security fence. In November 2005, DOE coordinated with State wildlife officials to remove the beavers in accordance with State regulations, and then breached the dam. Water levels in the slough have returned to normal

2D

(PL–3). A smaller beaver dam remains that has caused some ponding of water, but is not currently considered problem enough to warrant removal; the water had not risen to the elevation of the contaminated materials within the cell.

Seep locations along the base of the south side slope of the disposal cell were inspected and found to be dry. No water has been found at the seeps since the drain was installed north of the cell, which suggests that the drain is diverting water that otherwise would flow beneath the disposal cell.

Area Between the Disposal Cell and Site Boundary—Thick grass and thickets of native hardwood trees cover the area between the disposal cell and the site security fence. In 2003, spotted knapweed and poison hemlock had spread across much of the DOE property and were interspersed with native desirable plants. The knapweed is an undesirable invasive plant that was out-competing desirable species at the site. Poison hemlock poses a safety hazard to personnel who must walk through or work within infested areas. To comply with federal invasive species directives and to maintain plant diversity on the property, DOE initiated an aggressive weed control program of herbicide applications and mowing in spring 2004 after consultation with
2E Pennsylvania State University. DOE continued the vegetation control program in 2006 and only minor occurrences of immature plants were found. DOE will continue the weed management program in 2007.

Site Perimeter—A significant amount of seep water was observed along the security fence about 60 feet east of perimeter sign P8 and immediately west of the disposal cell. The area will continue to be monitored to ensure the water does not pose a threat to the integrity or performance of the disposal cell.

Since the removal of the beaver dam, water in the slough has returned to normal flows and relieved ponding that was covering the bottom of the security fence on the west end of the property (PL–3).

The base of the fence was sprayed with a broad-spectrum herbicide to keep vegetation from damaging the fence and to enable inspection of the fence. The mowing subcontractor also clears vegetation from along accessible portions of the fence before the inspections.

Outlying Area—The area beyond the site boundary for a distance of 0.25 mile was visually inspected for signs of erosion, development, and other changes that might affect the site. A dirt railroad access road along the north side of the tracks provides access to a long, narrow wooded area along the tracks that has been used for unpermitted dumping. Dumping activity appears to have decreased since 2004. Although township authorities are aware of the problem, none of the trash has been removed. This activity is not a direct threat to the disposal site but the amount of dumping is an indication of the overall level of activity near the disposal site and may be a predictor of vandalism. Other areas around the site remained unchanged.

Canada thistle, a state-listed noxious weed, was identified on railroad property near boundary monument BM–2 in 2002. As arranged with the Norfolk Southern Railroad, DOE treated the
2F infestation with herbicide in spring and fall since 2004. The treatment was continued in 2006.

2.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

2.3.3 Routine Maintenance and Repairs

In 2006, DOE installed an entrance sign, cleared encroaching vegetation along the site perimeter security fence and continued the undesirable vegetation and noxious weed control program.

2.3.4 Ground Water Monitoring

In accordance with the LTSP, DOE monitors ground water at this site, as a best management practice, to evaluate the performance of the disposal cell. The ground water monitoring network consists of eight wells (in four pairs) that are monitored for four target analytes: lead, molybdenum, selenium, and uranium. The revised LTSP (April 2000) stipulates monitoring is to be performed every 5 years. DOE last conducted ground water monitoring in November 2004 (presented in the 2005 report); the results indicated there is no contamination being released and that the disposal cell is performing as designed. The next monitoring is scheduled for October 2009.

2.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

2.3.6 Photographs

Table 2–2. Photographs Taken at the Burrell, Pennsylvania, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	265	Broken strands of barbed wire on south fence line.
PL–2	300	Vegetation growth on the disposal cell south side slope.
PL–3	100	Slough and west fence line

BUR 9/2006. PL–1. Broken strands of barbed wire on south fence line.

BUR 9/2006. PL–2. Vegetation growth on the disposal cell south side slope.

BUR 9/2006. PL–3. Slough and west fence line.

End of current section.

3.0 Canonsburg, Pennsylvania, Disposal Site

3.1 Compliance Summary

The Canonsburg Disposal Site, inspected on September 20, 2006, was in excellent condition. Repairs to flood damaged portions of the Chartiers Creek stream bank and the security fence, conducted in March 2005, were in as-built condition. Vegetation was reestablished on areas from which debris was removed in September 2005. Beaver damage to mature trees was noted on the creek bank north of the site. Stakeholders and regulators approved stream bank stabilization proposed and conducted by the Borough of Canonsburg. Sale of Area C property in the southeastern corner of the site was completed. Undesirable vegetation (Canada thistle and poison hemlock) was reduced compared to 2005, but ongoing control is recommended. Trash was removed from along Strabane Avenue. Ground water and surface water monitoring continued at the site to monitor ground water quality; results indicate elevated uranium in ground water does not extend beyond the site boundary or exceed the alternate concentration limit. Monitoring program modifications presented in the revised LTSP were conditionally concurred in by NRC with one additional requirement; continued annual monitoring of manganese in ground water at well MW−0412 and in surface water at location SW−0602 through the next 5-year evaluation period. No other maintenance needs or cause for follow-on inspection was noted.

3.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Canonsburg, Pennsylvania, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Canonsburg, Pennsylvania, Disposal Site* (DOE/AL/62350–203, Rev. 0, U.S. Department of Energy [DOE], Albuquerque Operations Office, October 1995) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 3–1.

Table 3–1. License Requirements for the Canonsburg, Pennsylvania, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Sections 3.1 and 7.0	Section 3.3.1
Follow-up or Contingency Inspections	Sections 3.2 and 6.2, Appendix E.4	Section 3.3.2
Routine Maintenance and Repairs	Section 6.1	Section 3.3.3
Ground Water Monitoring	Section 4.0	Section 3.3.4
Corrective Action	Section 4.4	Section 3.3.5

Institutional Controls—The 30-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license (10 CFR 40.27) in 1996. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site security fence, warning/no trespassing signs mounted on the security fence, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

3.3 Compliance Review

3.3.1 Annual Inspection and Report

The site, located between the communities of Canonsburg and Houston, Pennsylvania, was inspected on September 20, 2006. Features and photograph locations (PLs) mentioned in this report are shown on Figure 3–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

3.3.1.1 Specific Site Surveillance Features

Access, Gates, Fence, and Signs—Access to the site is directly from Strabane Avenue, a public right-of-way within the borough of Canonsburg in Washington County, Pennsylvania. The entrance gate, located at the southeast corner of the site along Strabane Avenue, was locked and in good condition. The vehicle gate on the northeast side of the site was inoperable due to a corroded padlock. The lock was cut off and the gate opened to allow access for pending stream
3A bank stabilization work. Gate rollers are corroded but the gate can be made operable. A new padlock was placed on this feature.

The site is surrounded by a chain link security fence with three strands of barbed wire at the top. The fence continues to rust but remains secure. Floodwater from the 2004 hurricanes damaged approximately a 400-foot-long section of the security fence between perimeter signs P6 and P8. In 2005, DOE replaced the damaged portion of the fence and moved it back from the top of the stream bank. The concrete boot at the bottom of several fence posts is exposed along the west and north sides, but the posts remain stable. Soil creep was observed along the base of the fence. This is a slow acting process that currently does not compromise site integrity, so no intervention is warranted but the stability will be monitored.

The site has an entrance sign at the entrance gate and 11 perimeter signs. The entrance sign was in good condition. Some perimeter sign are faded but remain legible. Perimeter signs will be replaced before they become illegible.

Site Markers and Monuments—The two site markers, three survey monuments, and four boundary monuments were undisturbed and in excellent condition.

Four pairs of erosion control markers (EMCs) were initially installed along the bank of Chartiers Creek. One of these markers, ECM–4A, was lost to erosion in 1997. This marker does not need to be replaced because the other marker in the pair, ECM–4, can be used for reference. Marker ECM–1A, difficult to locate because of thick vegetation, was found using global positioning system (GPS) equipment. ECM–2A was washed out in 2004 by flooding and was reset in 2005. All erosion control markers are in good condition.

Monitor Wells—The ground water monitoring network consists of six monitor wells (MW–0406A, MW–0410, MW–0412, MW–0413, MW–0414B, and MW–0424) that are sampled annually in accordance with the LTSP and the Ground Water Compliance Action Plan (GCAP). The wells were secure and in excellent condition.

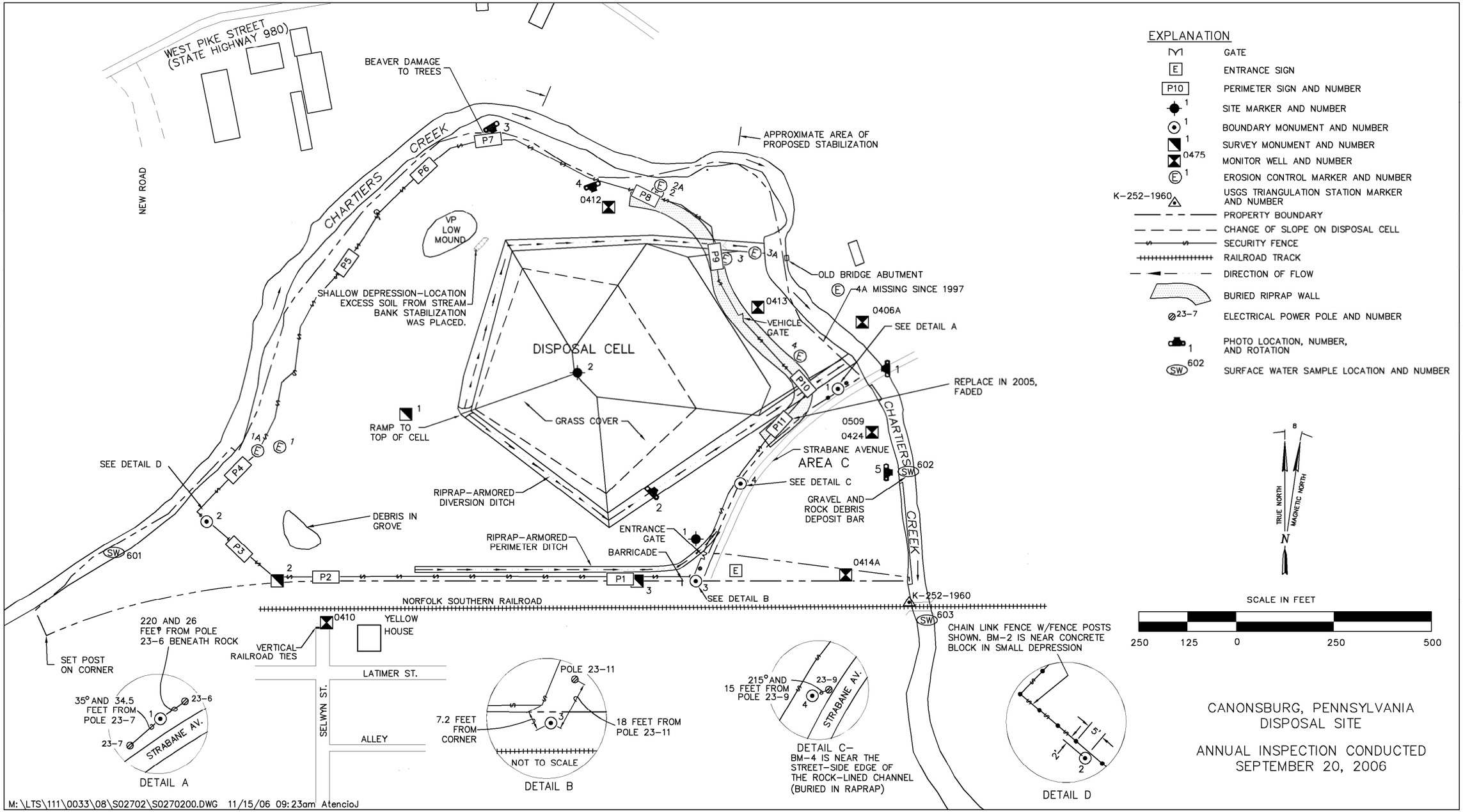


Figure 3–1. 2006 Annual Compliance Drawing for the Canonsburg, Pennsylvania, Disposal Site

3.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into five areas referred to as transects: (1) the disposal cell; (2) the diversion channels and perimeter ditch; (3) the other areas on site; (4) the site perimeter; and (5) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Disposal Cell—The grass-covered disposal cell surface was in excellent condition. The grass is mowed and mulched annually. There was no evidence of slumping, settling, erosion, or other modifying process.

In the past, occasional animal burrows have been found on the cell cover, but only topsoil material has been displaced. Because the buried tailings at this site are overlain by a 36-inch-thick clay layer (radon barrier), an 18-inch-thick rock layer, and a 12-inch-thick topsoil layer, biointrusion is unlikely and such burrows should not pose a risk to cell integrity or public health. The location and significance of burrows will continue to be monitored by inspectors each year. No fresh burrows were found in 2006.

The grass turf on the northeast side slope has been monitored for several years because it had appeared less healthy than that of the remainder of the site. For the past three years, including 2006, the inspections were conducted earlier in the growing season and the turf appeared healthy (PL–1). The condition of the turf in this area will continue to be inspected to verify that the vegetation is providing adequate erosion protection.

Areas on the northeast side slope of the disposal cell have scattered Canada thistle, a noxious weed. The affected areas were sprayed with herbicide in spring and fall 2006 and populations were found greatly reduced. The program of spraying and mowing in late spring and early fall will be continued.

3B

Diversion Channels and Perimeter Ditch—Diversion channels around the disposal cell and the perimeter ditch along the south side of the site are armored with riprap and were in good condition. These structures functioned as designed during the hurricane-related storms in 2004 by diverting storm water away from the cell and conveying it off site.

As noted during previous inspections, individual rocks have deteriorated. Although the occurrences are few and rock deterioration is not considered to be a problem at this time, DOE will continue to monitor the rock condition in the channels and ditch.

Vegetation in the diversion channels and perimeter ditch was treated with herbicide in 2005. Vegetation continues to grow in these features but does not impede function (PL–2).

Other Areas On Site—Thick grass covers the area surrounding the disposal cell. The grass extends beyond the security fence to the north and east as far as the bank of Chartiers Creek. The grass inside the site boundary, mowed and mulched at least annually in accordance with the LTSP, was in excellent condition.

Poison hemlock has been identified and controlled on the site as needed since 2003. This biennial weed is not a listed noxious species in Pennsylvania; however, it poses a safety hazard to personnel who must walk through or work within infested areas, as all plant parts are poisonous. Poison hemlock abundance and extent has been greatly reduced on site. Scattered poison hemlock was still present at several locations on site.

In 2006, noxious weed populations, primarily Canada thistle, were generally similar to what was found in 2005. Herbicide application and mowing will continue in an effort to control noxious weeds on site.

Site Perimeter—Trees, woody brush, and vines continue to encroach upon the security fence; however, the use of a tractor and brushhog is an effective and low-cost means of controlling vegetation in unwanted areas. Where terrain is too steep for the tractor, the vegetation is cleared by hand. Vegetation intertwined in the fence or weighing it down is also cleared by hand; it was last cleared in 2005. This activity also includes application of herbicide along the bottom of the fence to retard vegetation. Removal of vegetation helps preserve and maintain the fence. It also leaves the site appearing actively cared for and provides access to perform inspection of the fence and site perimeter. The base of the fence was treated with herbicide in 2006.

3C

Canada thistle plants interspersed with healthy vegetation along the outside of the security fence on the north side of the property were treated with a selective herbicide in 2006. No Canada thistle was found in this area at the time of the inspection. However, occasional poison hemlock plants were found along the fence. These plants will continue to be monitored to determine if control measures are required.

Chartiers Creek is an active, meandering waterway that is only partially restrained on the east end of the disposal site. The creek is slowly cutting into the bank and the equilibrium was upset by the flooding in 2004. Local and state officials have arranged grant monies to be applied to stabilizing the stream bank near perimeter sign P8. DOE and NRC representatives evaluated the proposed plan and agreed that the proposed work would not affect the integrity of the disposal cell. The Borough of Canonsburg sponsored the work. The work, performed in November 2006, consisted of cutting back the slope of the bank and armoring the toe with riprap keyed into bedrock. Above the riprap, the slope was protected by stabilization matting and planting of live fascines. DOE gave permission to remove portions of the fence fabric for access and to relocate the fence back away from the regarded slope to leave a bench for access to the stream bank. All excess soil removed from the stream bank was spread inside the security fence, between the disposal cell and the low vicinity property material mound, and revegetated.

3D

Beavers have been felling mature hardwood trees along the Chartiers Creek stream bank (PL–3). Only occasional trees are affected, and the trees are north of the site where the bank slope is flatter and the cross section of the drainage appears to be greater than further downstream.

Abundant vegetation remains on this portion of the bank. Inspectors will continue to monitor this activity for threats to stream bank stability.

DOE found the railroad had cleared and graded land west of the security fence, pushing debris (including vegetation and railroad ties) toward the stream bank and onto DOE property. DOE informed the railroad of the encroachment and provided property maps. At the time of this inspection railroad crews were removing railroad ties from DOE property. DOE set a lath at the west property corner using GPS equipment. DOE will set a survey marker on this property corner.

Outlying Area—The site is surrounded by residential and commercial property. The area outward for a distance of approximately 0.25 mile was visually inspected for development or change in land use that might affect the safety or security of the site. No changes in land use were observed.

Area C is a triangular, grass-covered parcel of vacant property across Strabane Avenue east of the site. Strabane Avenue, Chartiers Creek, and the railroad bound Area C. The Commonwealth of Pennsylvania sold Area C to a private party—it was not part of the DOE-owned Canonsburg Disposal Site, although the Commonwealth acquired the parcel under UMTRCA as part of the designated processing site. Area C is remediated except for two thorium anomalies that lie at a depth of about 8 feet. When the Canonsburg site was remediated, ingrowth of thorium was not considered as a cleanup criterion for meeting the radium-in-soil standard in the future. Ingrowth calculations indicate the radium-226 activities in soil will exceed the subsurface standard near the end of the 1,000-year longevity requirement for the disposal cell, which was taken to represent the intent of the rule for the soil standards of 40 CFR 192. Also, contaminated ground water was present beneath Area C, and DOE has an interest in preserving the configuration and integrity of the stream bank and maintaining access to monitoring locations on the parcel.

The Commonwealth put Area C up for sale to the public in 2001, but DOE informed the Commonwealth of restrictions on parcel transfers stipulated in UMTRCA and the Cooperative Agreement between DOE and the Commonwealth. Consequently, the sale was on hold while DOE conveyed to the Commonwealth specific instructions on implementing necessary land use controls. The state concurred that the deed for Area C, when transferred to another entity, will carry restrictions to limit excavation in the area and prevent the area from being used for residential purposes. The sale was completed in 2006.

3E

DOE has a monitor well in Area C (MW–0424) that is part of the ground water-monitoring network. DOE ensured ongoing access to this well through the sale agreement. (Monitor well MW–0414B is on the former Parcel Number 117, owned by DOE.)

The Chartiers Creek bank along Area C was reconstructed in 2001 to stop slumping. Reconstruction entailed rebuilding the bank 30 feet into the bank with alternating layers of drainage material, soil, and geotensile fabric, and keying riprap into the toe of the slope and placed it against filter fabric up to the height of normal high water. The reconstructed bank was revegetated with grasses, and native brush was allowed to establish.

In 2004, inspectors found that floodwater caused erosion damage to the stream bank. Approximately 100 feet of reconstructed stream bank was damaged downstream from the Strabane Avenue Bridge, and 200 feet was damaged upstream from the railroad bridge. Floodwater cut laterally into the bank as much as 6 feet in places but the structural system extends 30 feet into the bank. Floodwater scoured behind the riprap and fabric in places.

DOE notified NRC, performed a follow-up inspection of the damage, and developed recommendations for stream bank repair along the disposal cell and Area C. NRC concurred in the recommendations, and repair work was performed in April 2005. DOE restored the stream bank profile by filling scoured areas with riprap. Inspectors broadcast shrub and forb seed to further stabilize the bank with vegetation.

During the Chartiers Creek stream bank repair project, the surface of Area C was disturbed along the top of the bank and reseeded with the same grass mix used for the disposal cell. A good grass cover has become established in most areas. Along the top of the slope, however, scattered Canada thistle and poison hemlock plants have established. The infestations were treated in 2004, 2005, and 2006, along with the infested areas on the disposal site. In 2006, Canada thistle and scattered poison hemlock were found along most of the top of the bank in Area C. With transfer of property ownership, DOE has no further responsibility to maintain this property.

During the 2006 inspection, inspectors picked up trash along Strabane Avenue on and adjacent to DOE property. The maintenance subcontractor periodically picks up trash on and adjacent to DOE property to maintain the property's neat appearance. Spot cleanup of trash will be performed as needed during future inspections.

3.3.2 Follow-up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

3.3.3 Routine Maintenance and Repairs

In 2006, DOE replaced the lock on security fence northeast gate, mowed grass on and adjacent to the disposal cell, removed vegetation along the perimeter fence, and sprayed noxious and invasive weeds.

3.3.4 Ground Water and Surface Water Monitoring

3F DOE monitors ground water (PL–4) and surface water (PL–5) at the Canonsburg site to comply with requirements in the LTSP and the subsequent GCAP. The LTSP only requires monitoring as a best management practice; NRC determined cell performance monitoring to ensure compliance with surface remedial actions conducted under Subpart A of 40 CFR 192 was not required because the design of the disposal cell was adequate to provide long-term protection of human health and the environment. The GCAP requires monitoring to ensure compliance with Subpart B of 40 CFR 192 (i.e.; legacy uranium processing site-related contamination). To

achieve compliance with Subpart B of 40 CFR 192 at the site, the NRC approved action was no remediation in conjunction with the application of an alternate concentration limit (ACL) for uranium. Therefore, the purpose of monitoring at the site is to evaluate contaminant trends in ground water in the shallow unconfined uppermost aquifer, which consists of unconsolidated soils, stream deposits, and clean fill, and to ensure compliance with the ACL.

The monitoring network consists of six wells completed in the uppermost aquifer and three surface water locations in Chartiers Creek (Table 3–2 and Figure 3–1). The LTSP required best management practice sampling for two years after the site was licensed. This requirement was met by sampling in 1996 and 1997. However, because the concentration of uranium in some wells remained above the maximum concentration limit (MCL) of 0.044 milligrams per liter (mg/L), DOE continued to monitor these locations annually. Monitoring requirements to verify compliance with the GCAP includes four wells, three of which are considered point-of-compliance wells, and one surface location, considered a point of exposure (Tables 3–2 and 3–3). The GCAP requires monitoring for a period no less than 5 years (through 2004) and up to 30 years (through 2029—the estimated time for natural attenuation to occur). The LTSP was revised in September 2005 to combine these separate monitoring requirements (i.e.; LTSP and GCAP) into a comprehensive site-wide monitoring program; the revised LTSP was submitted to the NRC for concurrence.

Table 3–2. Ground Water and Surface Water Sampling Locations at the Canonsburg, Pennsylvania, Disposal Site

Sample Locations Current LTSP (October 1995)	Sample Locations GCAP (DOE 2000)	Sample Locations Revised LTSP (September 2005)
Monitor wells: MW−0410 Upgradient MW−0406 Downgradient[a] MW−0412 Downgradient MW−0413 Downgradient MW−0424 Downgradient MW−0414 Crossgradient[b]	Monitor wells: MW−0406 Downgradient MW−0412 Downgradient (POC) MW−0413 Downgradient (POC) MW−0414 Crossgradient (POC)	Monitor wells: MW−0406 Downgradient (BMP) MW−0412 Downgradient (POC) MW−0413 Downgradient (POC) MW−0414 Crossgradient (POC) MW−0424 Downgradient (BMP)
Surface water locations: SW−0601 Upstream SW−0602 Adjacent to Area C SW−0603 Downstream	Surface water location: SW-0602 Adjacent to Area C	Surface water location: SW-0602 Adjacent to Area C (POE)

[a]MW−0406 was destroyed during a sanitary sewer construction project in 2001 and replaced. The current designation is MW−0406A.
[b]MW−0414 has been replaced twice because of damage during construction. The current designation is MW−0414B.
BMP = best management practice
POC = point of compliance
POE = point of exposure

Table 3–3. Reference Standards for Ground Water and Surface Water Monitoring at the Canonsburg Disposal Site

Analyte	Standard	ACL	Standard Source
Uranium – ground water	0.044 mg/L	1.0 mg/L	40 CFR 192 -- MCL
Uranium – surface water	0.044 mg/L	0.01 mg/L	40 CFR 192 -- MCL
Molybdenum	0.1 mg/L	--	40 CFR 192 -- MCL
Manganese[a]	0.05 mg/L	--	40 CFR 143.3 -- Secondary drinking water standard

[a]A risk-based concentration of 1.7 mg/L has also been established for surface water based on EPA documentation (included in the revised LTSP).

Molybdenum and uranium are currently the target analytes identified in the LTSP (Table 3–4), with uranium being the analyte of primary concern. Target analytes under the GCAP are molybdenum, uranium, and manganese. In the revised LTSP, uranium is the only constituent of concern (COC). MCLs for molybdenum (0.1 mg/L) and uranium (0.044 mg/L) are established in Table 1 to Subpart A of 40 CFR 192 (Table 3–3). There is no standard for manganese; however, the performance standard adopted by the GCAP for manganese (0.05 mg/L) is the secondary drinking water standard established in 40 CFR 143.3 (a risk-based concentration of 1.7 mg/L has also been established for surface water based on EPA documentation and included in the revised LTSP). An alternate concentration limit of 1.0 mg/L was established for uranium in ground water in the GCAP for the point-of-compliance wells. An alternate concentration limit of 0.01 mg/L was established for uranium at the point-of-exposure surface water location.

Table 3–4. Analytes For Ground Water and Surface Water at the Canonsburg, Pennsylvania, Disposal Site

Field Measurements	Current LTSP		GCAP	Revised LTSP
	Water-Quality Indicators	Specific Analytes	Specific Analytes	All Analytes
Alkalinity Dissolved oxygen pH Specific conductance Temperature Turbidity	Calcium Chloride Magnesium Potassium Sodium Sulfate	Uranium Molybdenum	Uranium Manganese Molybdenum	Uranium

The revised LTSP includes the following modifications to the ground water and surface water monitoring program: (1) Eliminating the upgradient background well MW–0410 and two surface water sampling locations; the upstream location SW–0601 and the downstream location SW–0603 from the monitoring network (Table 3–2). (2) Eliminating water quality indicators and analyzing only uranium as the sole COC, along with the routine field measurements performed at the time of sampling (Table 3–4). (3) Conduct monitoring annually for the next 5 years (through 2010) and then reevaluate the monitoring program.

The objectives of the revised monitoring program are to (1) evaluate downgradient contaminant trends in ground water in the shallow unconsolidated materials and in surface water, (2) demonstrate that concentrations of uranium at the point-of-compliance (POC) locations are decreasing as predicted and that the system remains in compliance with the GCAP, and (3) ensure that remedial actions at the disposal site and Area C continue to protect human health, safety, and the environment.

In 2006, NRC reviewed the revised LTSP and responded to recommended modifications to the
3G monitoring program in the *Technical Evaluation Report, Canonsburg Uranium Mill Tailings Disposal Site* (October 2006). Monitoring program modifications were approved with one additional requirement; continued annual monitoring of manganese in ground water at well MW−0412 and in surface water at location SW−0602 through the next 5-year evaluation period (through 2010). Additionally, an inconsistency found between the LTSP and the real estate documentation (LTSP, Appendix B) regarding responsibility for maintaining Area C stream bank required clarification, and the current property deed required amendment to grant access for stream bank repairs, if needed.

Monitoring Results—Analytical results for ground water and surface water monitoring are presented below. Analytical results from the October 2005 monitoring were not available for the 2005 compliance report and are included in this report. The 2006 results are considered preliminary; data validation had not been completed at the time of this report but no quality issues were reported by the analytical laboratory, or are apparent, so those data are presented in this report. Should any problems with the 2006 ground water and surface water monitoring data be identified during the validation process, they will be addressed in the 2007 compliance report. Time-concentration plots, from 1995 through 2006, for the three target analytes—uranium, molybdenum, and manganese in ground water are shown on Figures 3−2 through 3−4 and in surface water on Figures 3−5 through 3−7.

Uranium is the analyte of primary concern at this site because of the frequency with which it has exceeded its MCL of 0.044 mg/L in two of the downgradient ground water monitoring wells (MW−0412 and MW−0413). In 2005 and 2006, uranium concentrations in these two wells continued above the MCL, but considerably below the ACL (Figure 3−2). Following a downward trend from 1996 through 1999, concentrations of uranium at well MW−0412 had increased from 2001 through 2005. In 2005, the highest uranium concentration since the LTSP-required monitoring began in 1995 was reported at 0.259 mg/L from this well; however, still significantly below the ACL of 1.0 mg/L. In 2006, the concentration of uranium from this well decreased to 0.12 mg/L. No definitive trend has established in well MW−0412. From 1995 through 2001, uranium concentrations in well MW−0413 displayed a downward trend. Since 2002, uranium concentrations in well MW−0413 have fluctuated but remain below the initial 1995 concentration and have not exceeded the ACL. Uranium concentrations were substantially below the MCL at the rest of the ground water monitoring locations in 2005 and 2006. Uranium concentrations at all surface water sampling locations in Chartiers Creek, although reporting a sight increase in 2006, continue near the laboratory detection limit and have displayed a decreasing trend since 2001 (Figure 3−5).

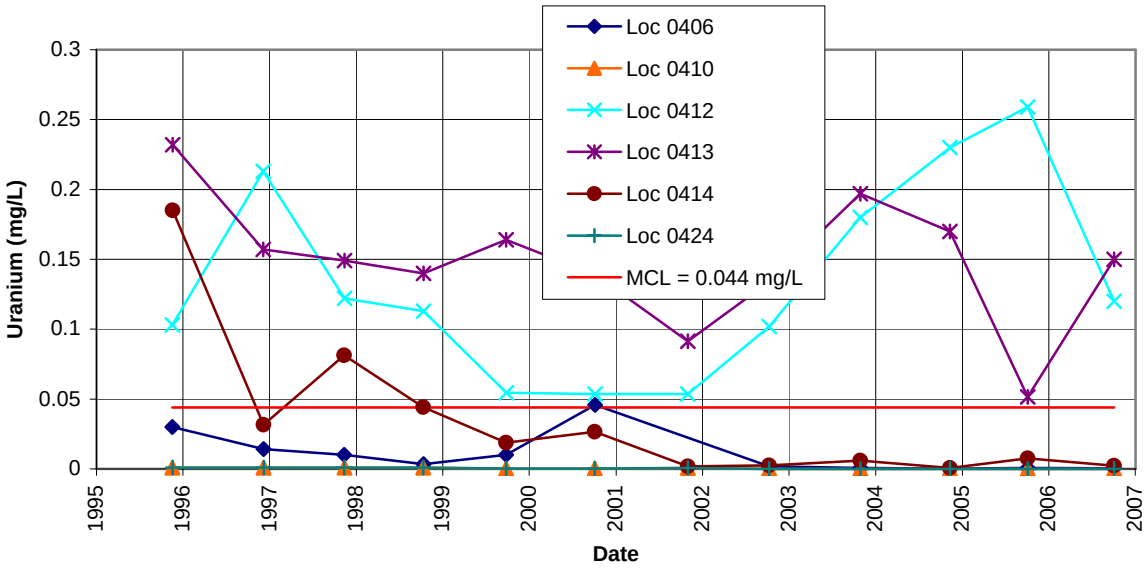


Figure 3–2. Time-Concentration Plots of Uranium in Ground Water at the Canonsburg, Pennsylvania, Disposal Site

DOE continues to consider the risk associated with uranium in ground water within the unconsolidated materials and shallow bedrock (defined as the uppermost aquifer for regulatory purposes) beneath the site to be negligible because neither unit is considered a viable aquifer from a water resource perspective, although the zone is capable of discharging to surface water (Appendix A to 10 CFR Part 40). Because the materials are not ideal for aquifer formation and the source of recharge to the shallow units is minimal, sustained yield to a well from these units would be limited. The shallow ground water is not used as a drinking water source in the area, although some domestic water is derived from a few private wells deeper than 100 feet. Institutional controls, in the form of government ownership of the site, prevent access to the ground water directly beneath the site. NRC concurred in deleting ground water use restrictions for Area C in 2003. Most of the residents in the area are connected to a municipal water system, which is supplied by surface water reservoirs upgradient from the site. Chartiers Creek, the discharge point for the shallow ground water beneath the site, is not a source of potable water. Additionally, uranium concentrations reported from samples collected from the creek are near the detection limit and have declined in recent years. Therefore, human health and the environment are adequately protected.

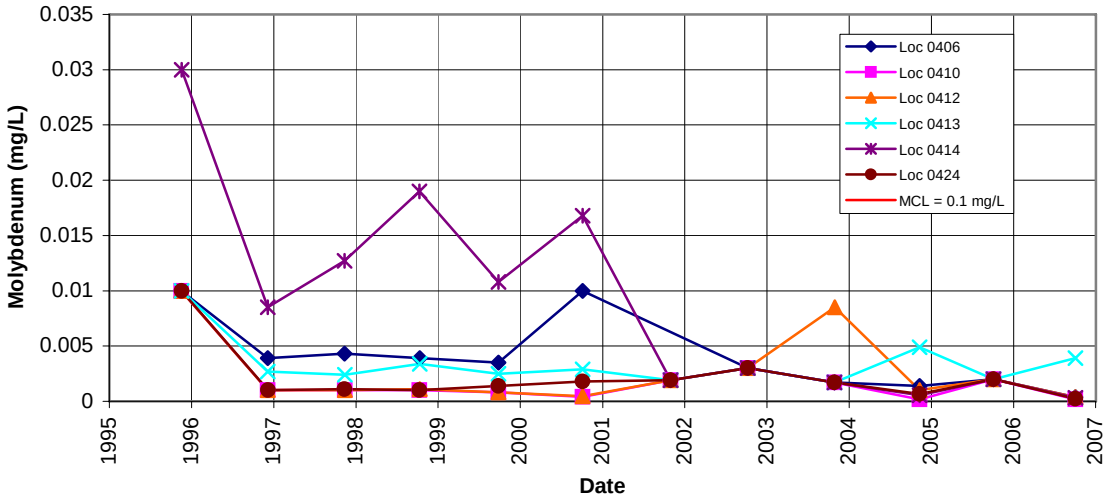


Figure 3–3. Time-Concentration Plots of Molybdenum in Ground Water at the Canonsburg, Pennsylvania, Disposal Site

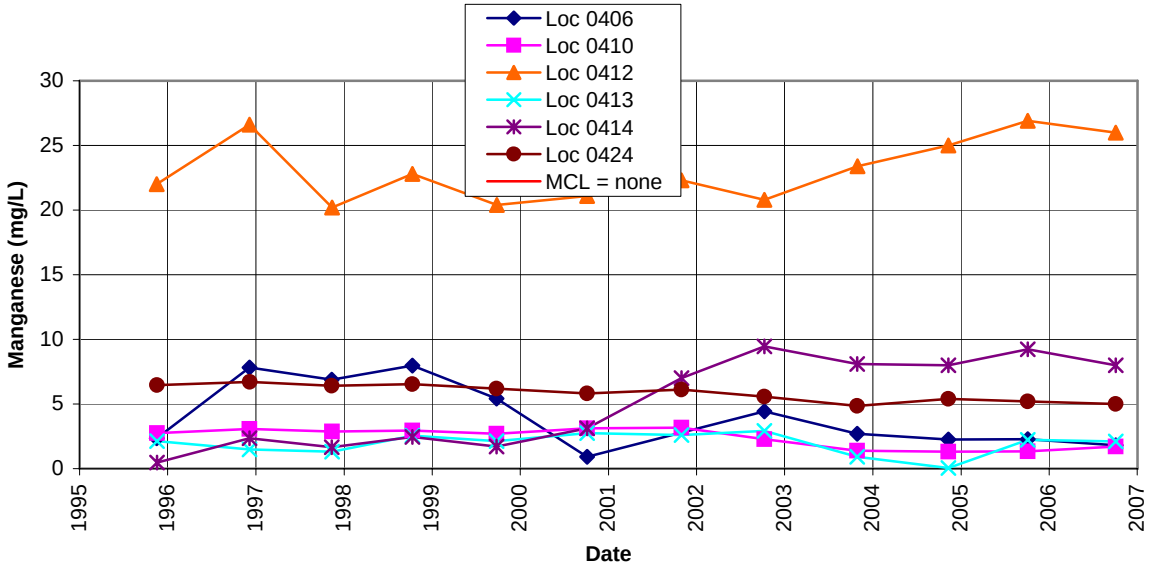


Figure 3–4. Time-Concentration Plots of Manganese in Ground Water at the Canonsburg, Pennsylvania, Disposal Site

Figure 3–5. Time-Concentration Plots of Uranium in Surface Water at the Canonsburg, Pennsylvania, Disposal Site

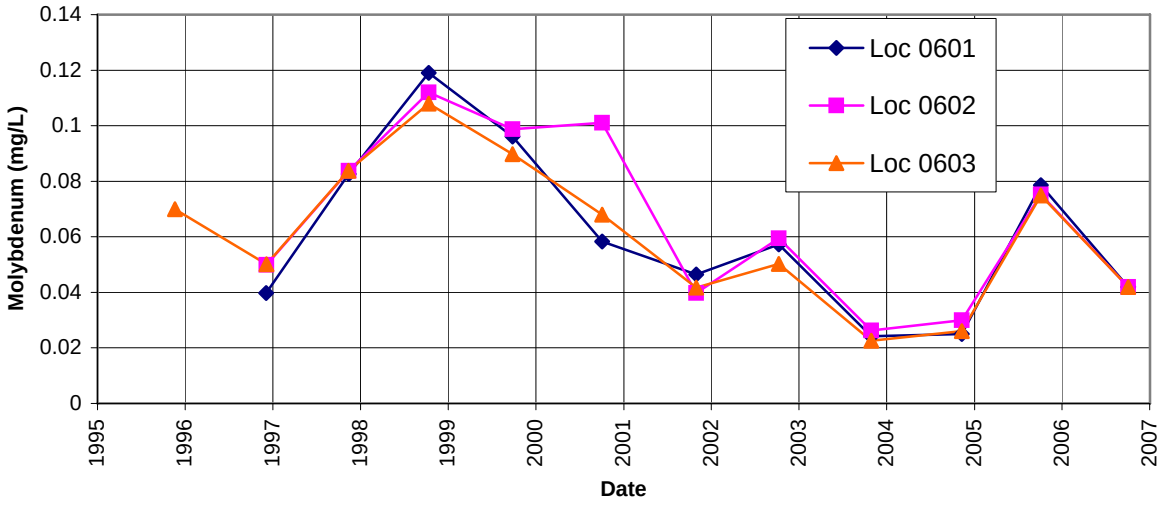


Figure 3–6. Time-Concentration Plots of Molybdenum in Surface Water at the Canonsburg, Pennsylvania, Disposal Site

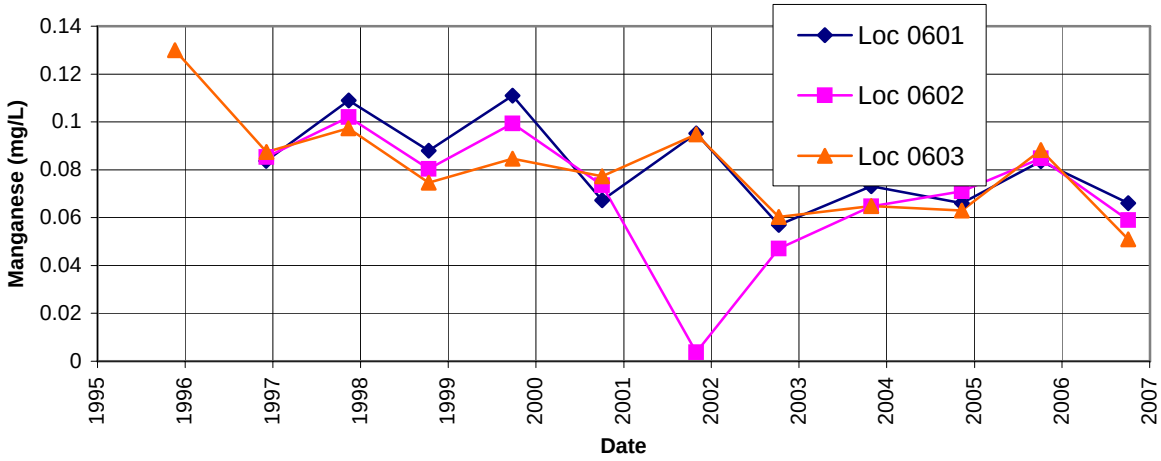


Figure 3–7. Time-Concentration Plots of Manganese in Surface Water at the Canonsburg, Pennsylvania, Disposal Site

In 2005 and 2006, molybdenum concentrations in ground water continued well below the MCL at all locations, with values remaining near the laboratory detection limit. Historically, the highest concentrations of molybdenum were reported from well MW−0414 during the initial years of monitoring. Concentrations in this well have decreased significantly in recent years and display an overall decreasing trend (Figure 3−3). In general, molybdenum concentrations at all other wells have remained relatively constant. The maximum concentration of molybdenum reported in 2006 was 0.0039 mg/L at well MW−0413.

The concentrations of molybdenum in the Chartiers Creek samples, as in the past, were higher than in ground water samples, though still well below the MCL of 0.1 mg/L. Concentrations at all locations exceeded the MCL in 1998 and again, although only slightly, at location SW−0602 in 2000 (Figure 3−6). Surface water concentrations both upstream and downstream of the site exceed concentrations in ground water. This indicates an ambient or upstream source of molybdenum rather than from site related activities. The surface water quality is indistinguishable between upstream and downstream locations. Molybdenum concentrations in both upstream and downstream locations display an overall decreasing trend, despite a relatively sharp increase at all locations in 2005.

Manganese concentrations in ground water continue to exceed the secondary drinking water standard of 0.05 mg/L at all point of compliance wells. In 2004, well MW−0413 had an apparent anomalous manganese concentration of 0.044 mg/L, just below the standard. Otherwise, results from 2005 and 2006 are generally consistent with results from previous years; no increasing or decreasing trends are observed with the exception of well MW−0414 where an overall increasing trend can be observed, which appears to have leveled off in recent years (Figure 3–4). Concentrations of manganese reported from well MW−0412 (26 mg/L in 2006) remain significantly above all other wells. The manganese concentration in the upgradient background well MW−0410 was below all other wells in 2005 and 2006; however, this well had exceeded the concentrations MW−0413 and MW−0414 from 1995 through 1999.

Manganese concentrations in surface water in Chartiers Creek (the point of exposure) display an overall decreasing trend at all three locations, although location SW−0602 appeared to have an anomalously low concentration in 2001 (Figure 3–7). With the exception of location SW−0602 in 2001 and 2002, all manganese concentrations in surface water remain above the secondary drinking water standard but well below the EPA risk based guideline of 1.7 mg/L.

3.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

3.3.6 Photographs

Table 3–2. Photographs Taken at the Canonsburg, Pennsylvania, Disposal Site

Photograph Location Number	Azimuth	Description
PL−1	290	Turf condition on northeast site slope.
PL−2	45	Vegetation in diversion channel.
PL−3	150	Beaver damage along Chartiers Creek.
PL−4	160	Ground water sampling.
PL−5	120	Surface water sampling.

CAN 9/2006. PL–1. Turf condition on northeast site slope.

CAN 9/2006. PL–2. Vegetation in diversion channel.

CAN 9/2006. PL–3. Beaver damage along Chartiers Creek.

CAN 9/2006. PL–4. Ground water sampling.

CAN 9/2006. PL–5. Surface water sampling.

End of current section

4.0 Durango, Colorado, Disposal Site

4.1 Compliance Summary

The Durango, Colorado, Disposal Site, inspected on June 7, 2006, was in good condition. The retention pond northeast of the disposal cell was designed to retain transient drainage water from the cell that has been collected and treated with zero-valent iron. Because the pore water level in the disposal cell has dropped and remained below the required elevation, water has not been treated since 2004. In June 2006, the criteria for permanent closure of the collection and treatment system, as presented in the LTSP, were met. Decommissioning of the collection drain, the permeable reactive barrier, and the retention pond are currently being prepared and anticipated to be complete in 2008. Monitoring results show that ground water compliance goals continue to be met at the site. Vegetation on top of the disposal cell remains healthy. Scattered bushes and trees on the side slopes of the disposal cell continue to encroach and woody plants greater than 3.5 feet in height are removed annually. Infestations of noxious weeds continue to be monitored and controlled with herbicide. Vandalism, primarily theft and damage to signs, continues at the site. The entrance sign was no longer legible and was replaced. No other maintenance or requirement for a follow-up inspection was identified.

4.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Durango, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Bodo Canyon Disposal Site, Durango, Colorado* (DOE/AL/62350–77, Rev. 2, U.S. Department of Energy [DOE], Albuquerque Operations Office, September 1996) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 4–1.

Table 4–1. License Requirements for the Durango, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 4.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 4.3.2
Routine Maintenance and Repairs	Section 8.0	Section 4.3.3
Ground Water Monitoring	Section 5.0	Section 4.3.4
Corrective Action	Section 5.0	Section 4.3.5

Institutional Controls—The 121-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1996. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, warning/no trespassing signs (referred to as perimeter signs) placed along the property boundary and a locked gate at the entrance to the site. The site is not fenced except along the county road. Verification of these institutional controls is part of the annual inspection.

4.3 Compliance Review

4.3.1 Annual Inspection and Report

The site, located southwest of Durango, Colorado, was inspected on June 7, 2006. Results of the inspection are described below. Features and photograph locations (PLs) discussed in this report are shown on Figure 4–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

4.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Gates, Entrance Sign, and Perimeter Signs—Access to the site is by La Plata County Road 212, which is a dedicated public right-of-way that crosses the southwest corner of DOE property. The entrance gate and guardrails along the county road, installed in 2000, and the original entrance gate closer to the cell were in good condition.

At the time of the annual inspection, the entrance sign was found with additional bullet holes and illegible; it was replaced in the fall 2006. Perimeter sign P2 near the site entrance again was
4A found missing; it was last replaced in the summer of 2005. This sign will not be replaced, as the site remains well delineated by the 80 other perimeter signs. All other perimeter signs were present and legible, although many of the perimeter signs, particularly those within view of the county road, have bullet holes.

Trespass and vandalism have been difficult to control at the site. Although DOE has implemented various engineered, institutional, and administrative controls at this site, including increased patrols by County Sheriff officers, vandalism continues to be an ongoing concern and maintenance issue. Impacts resulting from the construction of the nearby Animas-La Plata Project and increased recreational use in the area will be monitored.

Site Markers, Survey and Boundary Monuments—Site markers and survey monuments were in good to excellent condition. The site marker near the entrance gate (SMK–1) was slightly damaged by bullets years ago; however, it is legible and in generally good condition. Boundary monument BM–3 and two of its reference monuments are situated in a small gully and threatened by erosion; however, the monuments are currently stable. One of the reference monuments for boundary monument BM–4 is bent to the ground and the cap removed, but BM–4 is intact. No repair to any of these features is currently warranted. Boundary monument BM–6, located at the southwest corner of the site, was missing and presumably was destroyed during pipeline construction associated with the reservoir project. The monument will not be replaced because two witness monuments at that property corner are intact. The remaining boundary monuments were intact and generally in good condition.

Monitor Wells and Other Wells—Monitor wells were locked and in good condition. The cap on a drainage system vent well, PVC #1, is cracked but remains functional.

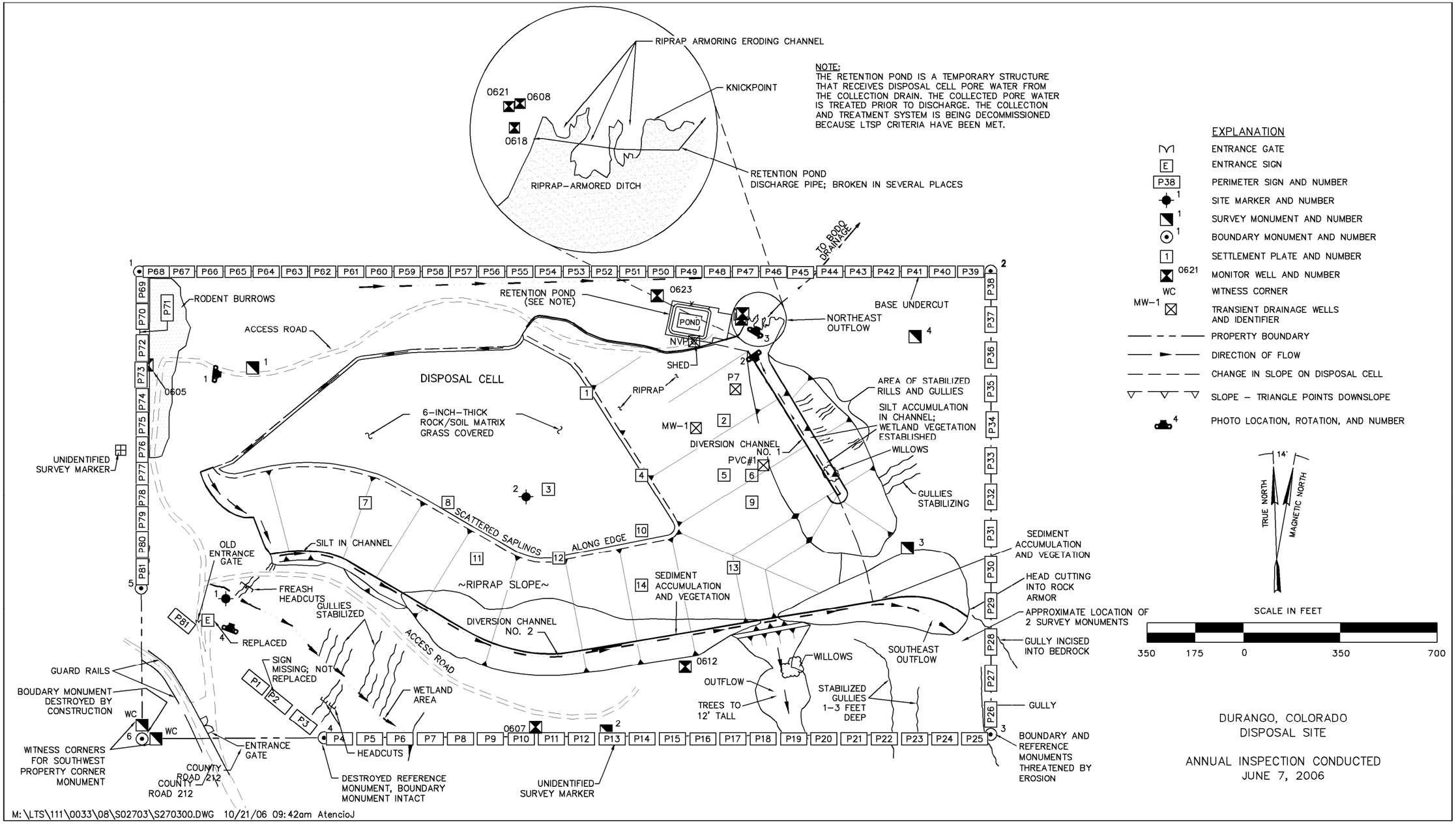


Figure 4–1. 2006 Annual Compliance Drawing for the Durango, Colorado, Disposal Site

4.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into six areas referred to as transects: (1) the top of the disposal cell; (2) the side slopes of the disposal cell; (3) the drainage ditches; (4) the treatment cells and holding pond; (5) the site boundary; and (6) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes.

Top of Disposal Cell—The top of the disposal cell was in excellent condition (PL–1). No evidence of settling, slumping, or erosion was observed.

Vegetation on top of the cell remains healthy, although a dry spring season had left many of the plants somewhat drought-stressed at the time of the inspection. The vegetation consists of seeded grasses and several volunteer species including deep-rooted woody shrubs. No woody species of trees and shrubs greater than 3 feet tall were found on the cell top during the 2006 inspection; the LTSP requires removal of these plants from the disposal cell (top and side slopes) when they exceed 3.5 feet in height. Noxious weeds were found on the cell top, although reduced population densities were noted as a result of past herbicide applications. Herbicide was again applied during the spring and fall of 2006.

Small rodents have dug burrows in the top of the disposal cell near site marker SMK–2. Burrow holes potentially could compromise the integrity of the cell cover, and therefore, will continue to be monitored; but do not appear to be a problem at this time.

Side Slopes of Disposal Cell—The riprap-covered side slopes of the disposal cell were in good condition. Disturbances resulting from natural processes, such as subsidence, rock deterioration, or slope failure, were not observed. In 2005, minor ruts were observed in the south side slope riprap cover; most likely caused by the herbicide applicator vehicle. These ruts were not noted during the 2006 inspection, and have likely stabilized.

Vegetation continues to encroach on the side slopes of the cell, particularly on the east and southeast sides. The species included deep-rooted shrubs and trees and several noxious weeds that require control by the state or La Plata County. The woody trees and shrubs greater than 3 feet tall were cut and herbicide was applied to their stalks. Herbicide was applied to the noxious weeds during the spring and fall of 2006.

4B

Drainage Diversion Channels—Rock-armored drainage diversion channels were constructed beneath the toe of the side slope along the northwest, south, and east sides of the disposal cell. These diversion channels direct runoff into natural drainages that carry storm water away from the disposal site. Side-slope erosion has resulted in sedimentation within the channels at several locations where the slopes above the channels are steep (PL–2). There was no evidence of recent slope erosion or accumulations of sloughed material into the diversion channels in 2006.

Moist sediments support wetlands vegetation and willows at places in Diversion Channel No. 1 along on the east side of the cell. The sediment deposits and plant growth will not compromise

the performance of the drainage channels in the event of a large storm. Should water be impounded in the channels, it would drain away from the disposal cell along bedding planes and permeable zones in the bedrock. However, if there is evidence of impounded water, maintenance will be conducted to remove the obstruction and restore flow out of the diversion channels. The riprap-covered outflow of Diversion Channel No. 1, referred to as the Northeast Outflow, was designed to erode back to a rock-filled trench and self-armor in the process. Significant movement of the knickpoint has not occurred since it was surveyed in 1999 (PL–3).

Infestations of noxious weeds in the diversion channels and surrounding areas continue to be monitored and controlled. The weeds were treated with herbicide in the spring and fall of 2006.

Treatment Cells and Retention Pond—Contaminated seeps, resulting from transient drainage from the cell, developed along the downgradient slope of the disposal cell shortly after construction. Beginning in 1989, the seep water was intercepted by a collection drain at the toe of the cell and piped by gravity flow to a retention pond, where it was regularly treated with the application of lime and then discharged to a nearby wash. In 1995, a permeable reactive barrier was constructed adjacent to the retention pond to treat the contaminated water; it has been operational since 1996. The treatment cells of the barrier contain zero-valent iron to remove metals from the contaminated water after it exits the collection drain and before it enters the pond.

At the time of the inspection, the retention pond, permeable reactive barrier, and surrounding security fence were in good condition. The retention pond discharge pipe is broken at several locations but does not require repair because no discharges are occurring or are expected to occur from the retention pond.

4C Criteria for permanent closure of the collection and treatment system as presented in Attachment 3 of the LTSP, required that once a cell pore water phreatic surface equilibrium elevation of no greater than 7,055 feet above mean sea level (MSL) was achieved, the collection drain was to be closed and following a 6-month waiting period the phreatic surface be checked again (using dataloggers with measurements collected at 6 hour intervals). As long as extrapolation of data continued to show the water level stayed below the critical level (7,055 feet above MSL), the collection drain should be left closed and checked at 6-month intervals for a minimum 2-year period. If the pore water elevation increased above 7,055 feet during any 6-month period, the drain would be reopened and the drainage/treatment cycle continued until the closure criteria was met (maximum steady-state conditions of no greater than 7,055 feet above MSL for a minimum 2-year period). If the steady state pore water elevation remained below 7,055 feet for the 2-year period, DOE would then prepare plans for decommissioning the collection drain, the permeable reactive barrier, and the retention pond.

The last time the system was reopened in April 2004, the phreatic surface elevation of the pore water within the cell had remained steady at 7,049 feet during the previous 6 months. The collection drain was closed in June 2004 to start a 2-year observation period. All subsequent 6-month waiting periods reported the phreatic surface equilibrium elevation to be within the criteria (e.g.; no greater than 7,055 feet above MSL). Pore water phreatic surface elevation was last reported at 7,049 feet in August 2006. The required 2-year observation period was completed in June 2006 and the LTSP criteria for closure was met. DOE has completed a draft plan for

decommissioning the collection drain, the permeable reactive barrier, and the retention pond. Completion of the treatment system decommissioning is dependent on regulatory and stakeholder approval, and is anticipated for the 2008/2009 timeframe.

Site Boundary—The site is not fenced. Missing and damaged perimeter signs indicate continued trespassing and vandalism. However, the guardrail and entrance gate off of the county road, installed in 2000, have effectively prevented vehicular trespass and the associated damage that had occurred prior to their installation.

The majority of rill and gully erosion on the south and north-facing slopes in the southwest portion of the site were stable. Establishment of vegetation in these areas, previous placement of rock, and exposure of resistant bedrock in the gullies are effectively preventing further erosion. However, fresh headcuts were noted in two gullies in the southwest portion of the site (PL–4). This erosion will not impact the disposal cell or its drainage channels and will continue to be monitored. No other areas of recent erosion were observed on or around the site.

Infestations of noxious weeds are present in the areas between the cell and the property boundary. These areas were sprayed with applications of herbicide during the spring and fall of 2006.

4D

Outlying Area—The area beyond the site boundary for a distance of 0.25 mile was visually inspected for signs of erosion, development, or other disturbance during the inspection. Previously, land uses were wildlife habitat and recreation. However, the U.S. Bureau of Reclamation currently is constructing the Animas-La Plata Project. As a result of this project, boundary monument BM–6 was destroyed. A water intake and pumping plant structure is under construction at the Animas River on the site of the former raffinate ponds. The pipeline between the pumping plant and the Ridges Basin Reservoir—currently under construction—is adjacent to County Road 211 and passes just south of the disposal site. Pipelines that were within the footprint of the reservoir were rerouted parallel to County Road 212 on the west side of the disposal site. The U.S. Bureau of Reclamation erected a sign adjacent to the disposal site entrance that contains a map of the project and a Notice of Closure for the Ridges Basin area. The DOE disposal site is immediately adjacent to the northern Ridges Basin area boundary. Recreational use of the outlying area is expected to increase substantially upon completion of the reservoir project.

4.3.2 Follow-up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

4.3.3 Routine Maintenance and Repairs

In 2006, the entrance sign was replaced, woody species on the cell side slopes were cut and treated with herbicide, and noxious weeds were treated with herbicide during spring and fall applications.

4.3.4 Ground Water Monitoring

4E In accordance with the LTSP, ground water is monitored at the Durango site to verify the initial performance of the disposal cell. The monitoring network consists of seven wells (Table 4–2). Four wells are completed in the uppermost aquifer (bedrock of the Cliff House Sandstone and the Menefee Formation), including one upgradient background well (MW–0605) and three downgradient point of compliance wells (MW–0607, MW–0612, and MW–0621). Three wells are completed in the alluvium: one upgradient (MW–0623) and one downgradient (MW–0608) from the disposal cell. The third alluvial well, monitor well MW–0618 (screened to the bottom of the alluvial aquifer), was installed adjacent to well MW–0608 (screened to 10 feet above the base of the alluvial aquifer) and added to the monitoring network in 2002, as a best management practice, because it intercepts the full saturated zone of the alluvial aquifer.

Table 4–2. Ground Water Monitoring Network at the Durango, Colorado, Disposal Site

Monitor Well	Well Compliance Type	Hydrologic Relationship
MW−0605	Background	Upgradient (uppermost aquifer)
MW−0607	Point of Compliance	Downgradient (uppermost aquifer)
MW−0612	Point of Compliance	Downgradient (uppermost aquifer)
MW−0621	Point of Compliance	Downgradient (uppermost aquifer)
MW−0623	Background	Upgradient (alluvial aquifer)
MW−0608		Downgradient (alluvial aquifer)
MW−0618		Downgradient (alluvial aquifer)

Ground water samples are collected annually and analyzed for three indicator parameters: molybdenum, selenium, and uranium. The standards for the three indicator parameters are the respective maximum concentration limits (MCL) established by the U.S. Environmental Protection Agency in Table 1 to Subpart A of 40 CFR 192 (Table 4–3).

Table 4–3. Maximum Concentration Limits for Ground Water at the Durango, Colorado, Disposal Site

Constituent	MCL (mg/L)
Molybdenum	0.1
Selenium	0.01
Uranium	0.044

Key: MCL = maximum concentration limit
Note: EPA MCLs as listed in 40 CFR 192 Table 1, Subpart A.

With the exception of the uranium concentration in MW–0618, the results of monitoring in 2006 were consistent with previous years. Concentrations of all three indicator analytes were below their respective MCLs, and many results were less than detection limits. Concentrations of uranium were all less than 0.041 mg/L, selenium less than 0.007 mg/L, and molybdenum less than 0.001 mg/L. Time-concentration plots for uranium, selenium, and molybdenum are included as Figures 4–2, 4–3, and 4–4, respectively.

As shown on Figure 4–2, the highest uranium concentrations occur in monitor well MW–0618; which continue to oscillate, but remain below the MCL. DOE had considered the concentration in 2004 to be anomalous and suspected the cause of the anomaly to be correlated with the closure

of the collection drain system. However, the uranium concentration of 0.041 mg/L reported in 2006 increased as compared with the previous year and is consistent with the 2004 result. Because only four data points are available for this well, trend analysis is inconclusive for this constituent and additional monitoring is needed.

The 2006 monitoring results show that ground water compliance goals continue to be met at the site.

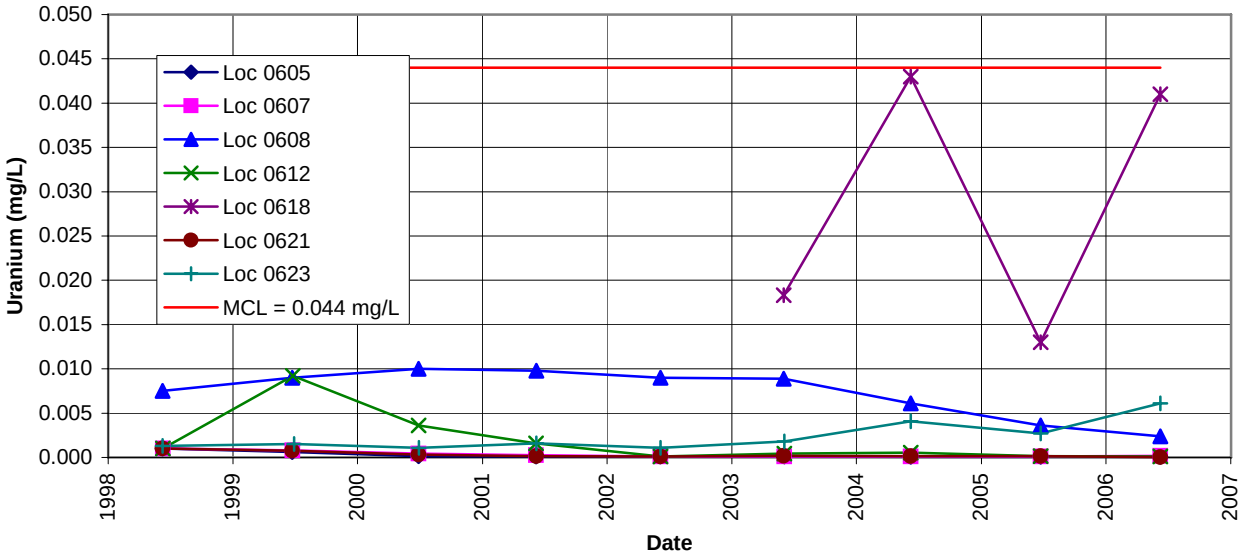


Figure 4–2. Time-Concentration Plots of Uranium in Ground Water at the Durango, Colorado, Disposal Site

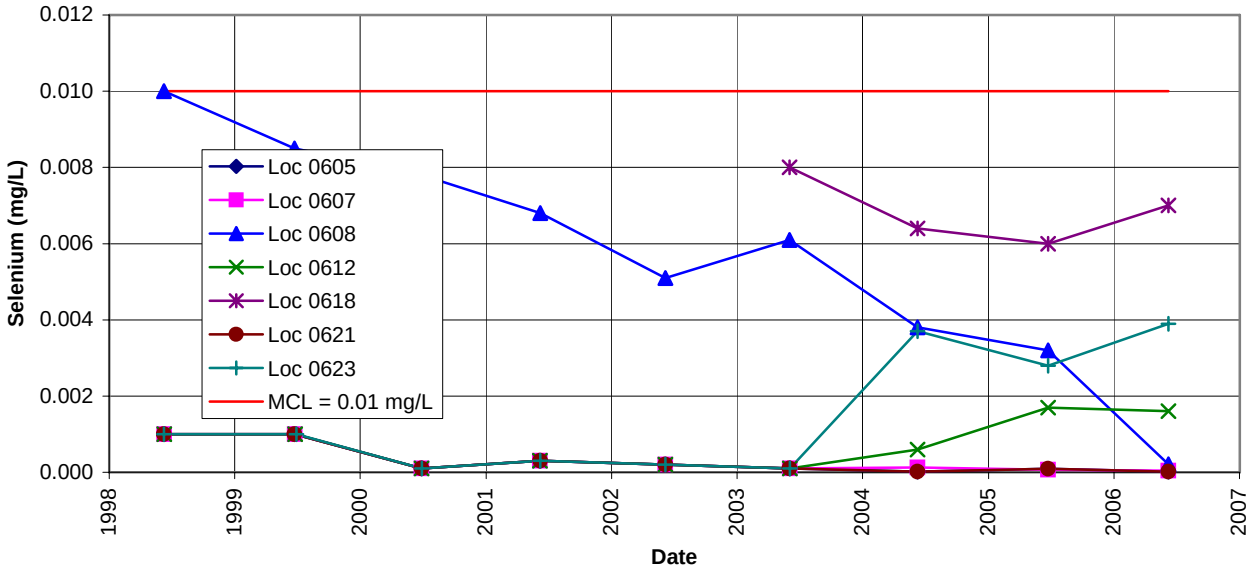


Figure 4–3. Time-Concentration Plots of Selenium in Ground Water at the Durango, Colorado, Disposal Site

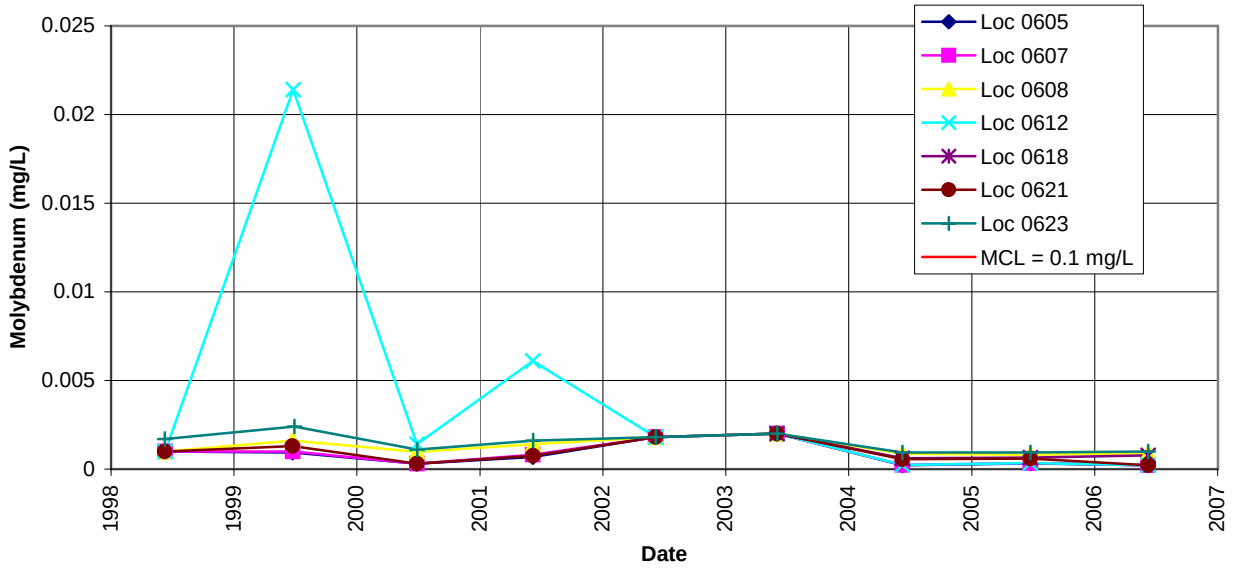


Figure 4–4. Time-Concentration Plots of Molybdenum in Ground Water at the Durango, Colorado, Disposal Site

4.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

4.3.6 Photographs

Table 4–4. Photographs Taken at the Durango, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	95	Disposal cell top.
PL–2	150	Sediment deposition in Diversion Channel No. 1.
PL–3	330	Northeast Outflow; no new erosion.
PL–4	20	Fresh headcuts in gullies in the southwest portion of the site.

DUR 6/2006. PL–1. Disposal cell top.

DUR 6/2006. PL–2. Sediment deposition in Diversion Channel No. 1.

DUR 6/2006. PL–3. Northeast Outflow; no new erosion.

DUR 6/2006. PL–4. Fresh headcuts in gullies in the southwest portion of the site.

End of current section.

5.0 Falls City, Texas, Disposal Site

5.1 Compliance Summary

The Falls City Disposal Site, inspected on January 24, 2006, was in excellent condition. An aggregate ramp was installed across the west corner of the cell side slope to facilitate access to the cell top during haying operations. Ground water monitoring results indicate essentially steady-state conditions for the last year. In 2006, the ground water monitoring program was evaluated as required every 5 years by the Long-Term Surveillance Plan (LTSP); recommendations were incorporated into a revised draft LTSP that is planned for U.S. Nuclear Regulatory Commission (NRC) submittal in early 2007. The damaged northwest perimeter fence was replaced. Two missing perimeter signs were replaced. The support post for a perimeter sign was damaged and will be reinstalled. Ongoing maintenance items include grass management and control of small trees and shrubs growing in the riprap on the side slopes. No other maintenance needs or cause for a follow-up or contingency inspection were identified.

5.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Falls City, Texas, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Falls City, Texas, Disposal Site* (DOE/AL/62350–187, Rev. 3, U.S. Department of Energy [DOE], Albuquerque Operations Office, July 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 5–1. Ground water monitoring is conducted in accordance with both the LTSP and the Ground Water Compliance Action Plan (GCAP) (DOE, Grand Junction, Colorado, March 1998).

Table 5–1. License Requirements for the Falls City, Texas, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Sections 6.0 and 10.0	Section 5.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 5.3.2
Routine Maintenance and Repairs	Section 8.0	Section 5.3.3
Ground Water Monitoring	Section 5.0 (and the GCAP)	Section 5.3.4
Corrective Action	Sections 5.0 and 9.0	Section 5.3.5

Institutional Controls—The 231-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1998. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the site entrance. Verification of these institutional controls is part of the annual inspection.

5.3 Compliance Review

5.3.1 Annual Inspection and Report

The site, located east of Falls City, Texas, was inspected on January 24, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 5–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

5.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Gate, Fence, and Signs—Access to the site is through a vehicle gate directly off of a public right-of-way (Farm-to-Market Road 1344). The main entrance gate and another vehicle gate on the same side of the property were locked and functional.

5A A barbed-wire fence surrounds the site and is set on the property boundary. The fence on the northwest boundary and the vehicle gate on the north property corner were replaced (PL–1 and PL–2). This portion of the fence and the gate predated cell construction. The fence was damaged during county road maintenance.

The entrance sign, located at the main entrance gate, was in excellent condition. There are 64 perimeter sign locations along the site boundary; two perimeter signs were missing and replaced in November 2005 during ground water monitoring. The support post for perimeter sign P20 was knocked askew by equipment during disking operations and was reinstalled (PL–3).

Site Markers and Monuments—The two site markers, three survey monuments, and two boundary monuments were undisturbed and in excellent condition.

Monitor Wells—Monitor well MW–0709 was locked and in excellent condition. The other wells in the ground water monitoring network were inspected when they were sampled during May and October 2006. At that time, all sampled wells were secure and in excellent condition.

5.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the top and side slopes of the disposal cell; (2) the site perimeter; and (3) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes.

Top and Side Slopes of the Disposal Cell—The top of the disposal cell is covered with well-established grass and was in good condition (PL–4). Typically, the grass is cut and baled by a
5B local hay farmer; usually two cuttings are performed each year from the disposal site. Grass that grows after the second cutting is shredded, or mulched, in spring to increase water retention. Grass cutting appears to be an effective control for keeping trees and woody shrubs from establishing on the cell top. The farmer spot sprays any deep-rooted woody vegetation that is found.

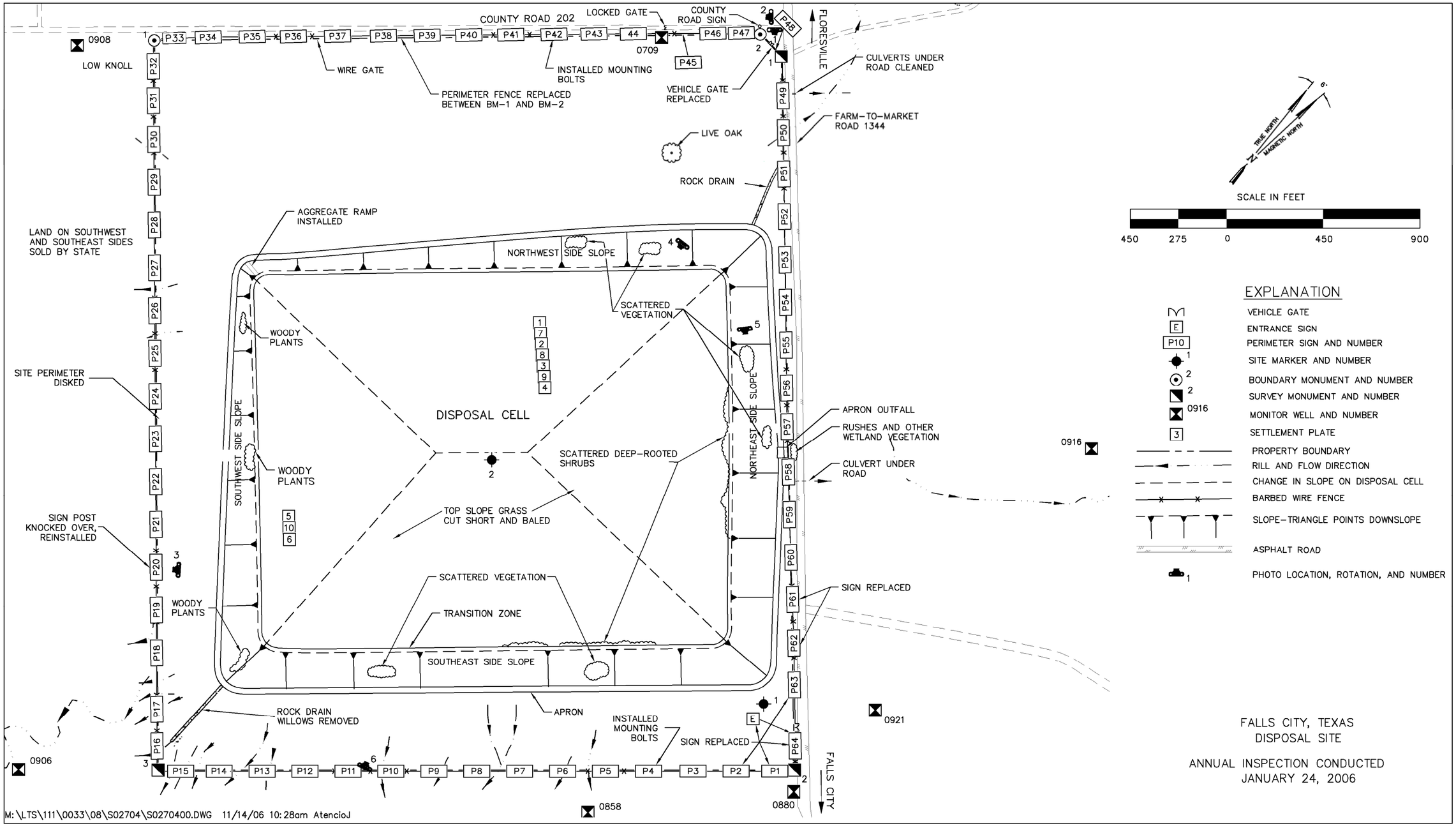


Figure 5–1. 2006 Annual Compliance Drawing for the Falls City, Texas, Disposal Site

During this inspection, the grass on the top slope was cut short to control the risk of fire. Vegetation is dense and no sparse or barren areas were noted. The grasses were beginning to emerge from dormancy. An ongoing drought reduced hay production in 2005 to one cutting (rainfall in 2005 was about 7.5 inches; normal rainfall is about 35 inches per year). Desiccation cracks were abundant, and no indication of standing water was noted.

Minor woody vegetation, mostly mesquite, was scattered across the top slope. The woody vegetation was treated with herbicide.

The side slopes are covered with riprap and were in good condition. As noted during previous inspections, minor amounts of fractured riprap were observed along the side slopes. The fractured riprap apparently is an artifact of quarrying and placement of the rock and does not appear to be degrading. However, DOE continues to visually monitor the riprap for indications of rock degradation.

Inspectors did not see any indication of slumping, settlement, rock creep, erosion, or other sign of instability.

5C To facilitate access to the top of the disposal cell with haying equipment, DOE installed a free-draining ramp of angular aggregate on the west corner of the cell on top of the existing riprap. Turf maintenance will be required in perpetuity. The two tracks of reinforced rubber conveyor belt material previously used for access were removed.

Trees and woody shrubs, including deep-rooted greasewood, tend to establish on the side slopes and require periodic removal. Although less than in previous years, patches of these plants were present at the time of the inspection. At the time of the inspection, deep-rooted species were observed growing again in areas that were previously treated with herbicide. The most prevalent areas were found in various locations along the southeast and northeast side slopes (PL–5). The trees and shrubs on the side slopes were cut and herbicide was applied to their stems.

During the inspection a representative with the Texas Radiation Safety Licensing Branch, Texas Department of State Health Services collected gamma exposure rate measurements as he walked across the cell top and around the site perimeter (PL–6). He indicated none of the measurements caused concerns about protectiveness. The elevated gamma exposure rates between perimeter signs P14 and P15 were in an area where the topsoil was thin or absent, and the uranium-bearing Deweesville/Conquista strata were exposed. Results are presented in Table Table 5–2.

Table 5–2. Gamma Exposure Rates at the Falls City, TX, Disposal Site

Measurement Location	Gamma Exposure Rate (uR/hr)
Disposal Cell Top	
East corner	25
Midpoint to center	30-35
Center at SMK-2	28-30
Midpoint to west corner	25-30
West corner	30
Site Perimeter	
P29	18
P28	18
P27	15
P26	16
P25	14
P24	15
P23	15
P22	15
P21	18
P20	20
P19	20
P18	20
P17	20
P16	20
SM 3	16
P15	25
P14	50
Midway between P14 and P13	50-60
P13	30
P12	20
P11	30
P10	20
P9	20
P8	18
P7	20
P6	18
P5	18
P4	20
P3	15
P2	13
P1	20
SM2	18
P64	20

P = perimeter sign; uR/hr = microroentgen per hour

Site Perimeter—The area between the fence and the toe of the disposal cell is covered with well-established grass. The grass is managed by cutting and baling, which also is an effective control against the growth of trees or other woody plants. The grass is left uncut along the fence, along rock drains, and around the site markers. The farmer disked a strip about 20 feet wide along the inside of the perimeter fence as a firebreak, because the grass on the adjacent parcel had not been cut or grazed.

No water was observed flowing in either the north or the south rock drains. Grass growing in both drains has not historically impeded the flow of water draining from the cell. Water was observed contained within the drains and there was no evidence of large pools of water impounded by grass encroachment. The apron outfall, midway along the northeast side slope, is

not yet affected by grass encroachment. Grass in the rock drains may actually assist in dissipating the energy of site runoff, and may, therefore, be a desirable feature. Willows found growing in the south rock drain in 2005 were cut and the stumps treated with herbicide. Inspectors saw no evidence of additional erosion in the south portion of the site, where rills developed after cell construction and before the grass became established.

One of the three large culverts that extend beneath Farm-to-Market Road 1344 near perimeter sign P49 that was partially obstructed with sediment and weed accumulation in 2005, was free of debris.

Outlying Area—The area outward for a distance of 0.25 mile from the site boundary was visually inspected. No development or disturbance that could affect the site was evident. The State of Texas sold the remainder of the former processing site east of the disposal site. The buyer briefly grazed the parcel but removed the livestock when the available water dried up. Grass on the parcel is between two and three feet high and local residents are concerned about the wildfire hazard. Future site inspectors will watch for any land use changes on the parcel. DOE acquired a copy of the deed and confirmed that land use restrictions were placed on the deed. The restrictions prohibit residential use and withdrawal of the shallow ground water.

5.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

5.3.3 Routine Maintenance and Repairs

In 2006, DOE replaced two perimeter signs and reinstalled the post for perimeter sign P20. DOE installed an aggregate ramp across the west corner of the cell side slope to facilitate access to the cell top during haying operations. DOE replaced the damaged northwest perimeter fence and north vehicle gate. DOE also continued grass cutting and bailing on the cell top and between the cell and the site perimeter, and controlled trees and woody shrubs growing in the riprap on the side slopes and along the south rock drain.

5.3.4 Ground Water Monitoring

5D

DOE monitors ground water at the Falls City site as a best management practice to (1) demonstrate the initial performance of the disposal cell, and (2) ensure that potential users of ground water downgradient from the site are not exposed to processing-related contamination. Because narrative supplemental standards apply to the uppermost aquifer at this site, no concentration limits or point of compliance have been established. Ground water in the uppermost aquifer beneath the site is designated as limited use (Class III) because it is not currently or potentially a source of drinking water due to widespread ambient contamination that cannot be cleaned up using methods reasonably employed by public water supply systems. Background water quality varies by orders of magnitude in the area because the uppermost aquifer is in an area of naturally occurring redistribution of uranium mineralization. Ground water monitoring samples at the site are collected from the Conquista and Deweesville sandstone

units and from the underlying Dilworth aquifer, both of which comprise the uppermost aquifer for regulatory purposes.

The disposal cell performance-monitoring network consists of five monitor wells (MW−0709, MW−0858, MW−0880, MW−0906, and MW−0921) that are all completed in the uppermost aquifer and sampled semiannually as specified in the LTSP. Two additional cell performance wells (MW–0908 and MW–0916), also completed in the uppermost aquifer, are designated for water level measurements only. The ground water compliance-monitoring network consists of five monitor wells (MW−0862, MW−0886, MW−0891, MW−0924, and MW−0963) that are completed in the two uppermost aquifers and sampled annually as specified in the GCAP. Ground water samples from the ten monitor wells are analyzed for 33 constituents, including ten that have maximum concentration limits (MCL) specified in Table 1 to Subpart A of 40 CFR 192. Ground water level monitoring is performed for all wells in both the disposal cell performance monitoring network and the ground water compliance-monitoring network. The monitor well networks are shown on Figure 5–2.

The LTSP identifies pH levels in ground water as a sensitive indicator of changes in geochemical conditions. Because pH exerts a major control of contaminant transport (e.g., contaminant mobility generally increases as pH decreases), pH was chosen as an indicator parameter for determining changes in the baseline geochemical conditions. Changes in the baseline geochemical conditions may also be indicative of disposal cell performance on the basis of tailings pore-fluid chemistry. Tailings pore fluids were generally lower in pH than background ground water. However, because pH levels and other signature contaminants in tailings pore fluids are essentially indistinguishable from processing-related contamination, it is difficult to distinguish the possible contribution of contamination from the disposal cell from that which resulted from legacy processing-site activities. Nevertheless, it was anticipated that changes in pH could be used to predict changes in uranium concentrations. Statistical analysis has since indicated only a moderate correlation exists between changes in pH and changes in uranium in the affected portions of the uppermost aquifer beneath the site. Time-concentration plots for pH and uranium from 1996 through May 2006 are included as Figures 5–3 through 5–6.

In 2006, sampling for the biannual disposal cell performance monitoring was conducted in May and October, and sampling for the annual ground water compliance monitoring was conducted in May. Analytical results from the October 2006 disposal cell performance sampling were not available in time for inclusion into this report and will be reported in the 2007 compliance report. In the same regard, the November 2005 disposal cell performance sampling results were not available for inclusion in the 2005 compliance report and are presented in this report.

Ground Water Quality Monitoring—Analytical results from November 2005 and May 2006 were generally consistent with previous results and what would be expected of ground water conditions in a naturally mineralized area that has been impacted by uranium exploration, mining, and processing activities.

Levels of pH did not vary significantly from previous results, and have historically shown consistency (within approximately one standard unit of measurement) since late 1998 with one exception. pH at MW−0886 fluctuated approximately two and one-half standard units (s.u.) of measurement (Figures 5–3 and 5–4).

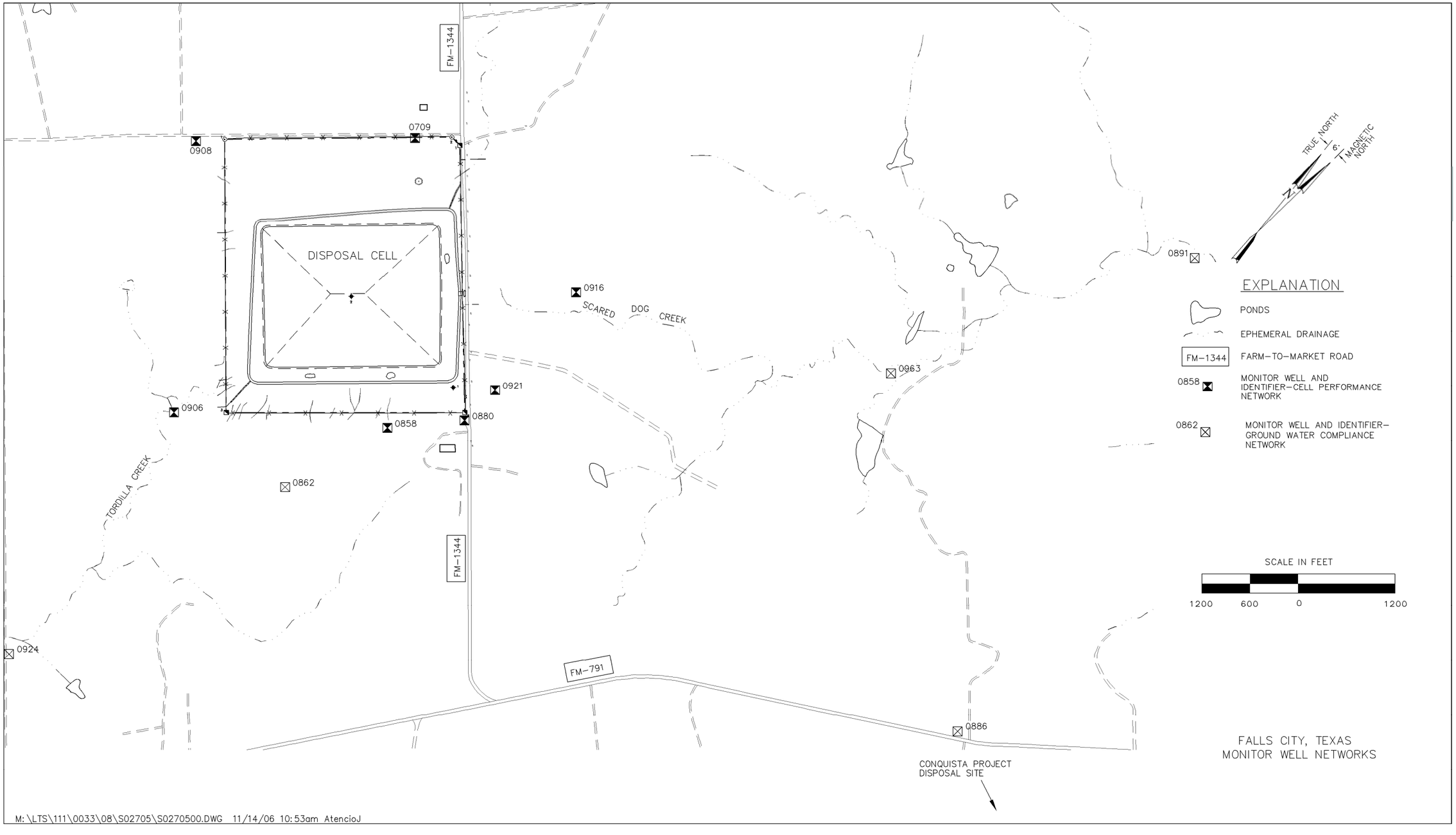


Figure 5–2. Monitor Well Network at the Falls City, Texas, Disposal Site

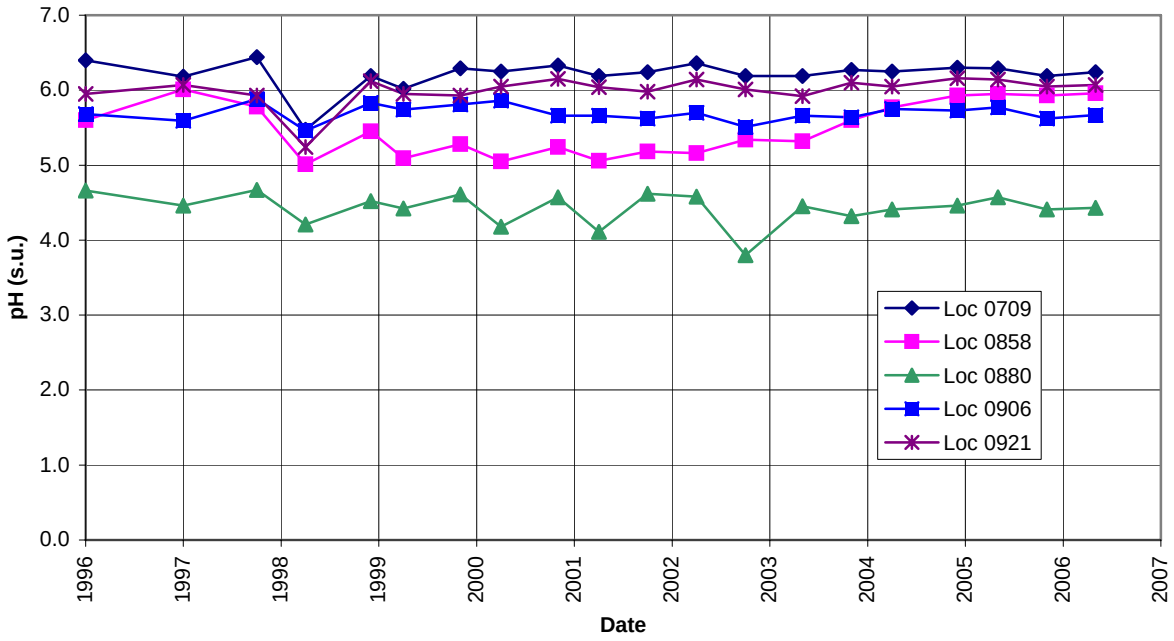


Figure 5−3. pH in Ground Water at Cell Performance Monitoring Locations at the Falls City, Texas, Disposal Site

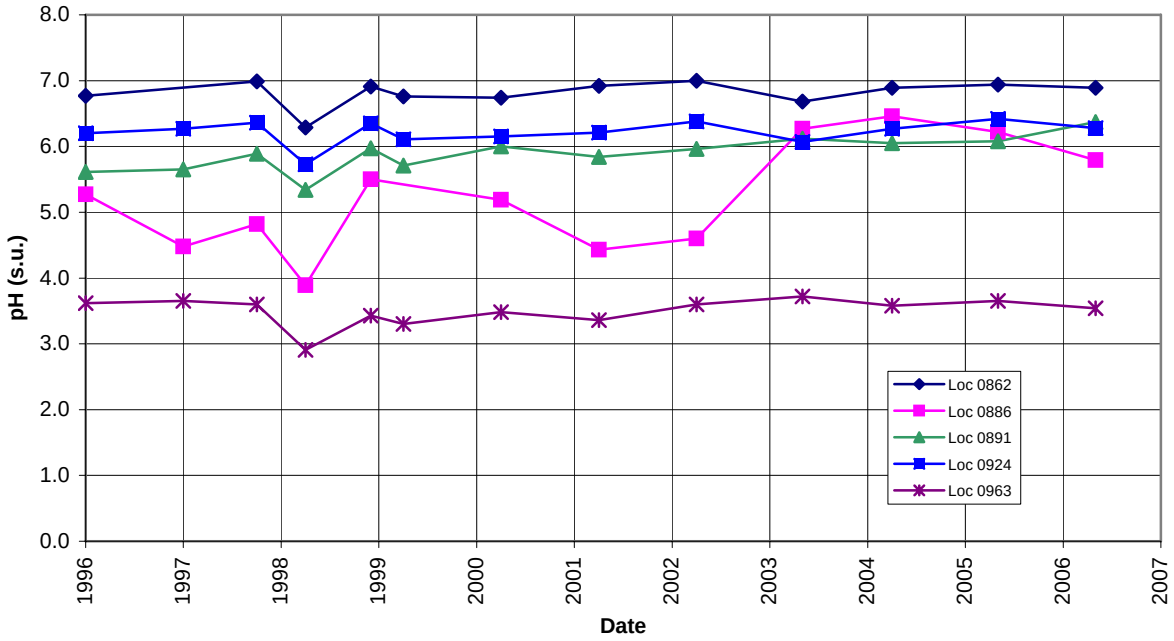


Figure 5−4. pH in Ground Water at Compliance Monitoring Locations at the Falls City, Texas, Disposal Site

Uranium concentrations in ground water in the vicinity of the disposal cell (i.e., performance monitoring) exceeded the MCL (0.044 milligrams per liter [mg/L]) in all but one monitor well, MW−0858 (Figure 5–5). This is consistent with historical data. The uranium concentrations also continue to be stable in all but one monitor well (MW−0880). The concentration in monitor well MW−0880 continues a recent decreasing trend that began in 2004. However, relative to historical results, an increasing trend still prevails; additional data is needed to determine if the recent decreasing trend will continue at this well. Historically, the concentration of uranium in monitor well MW−0880, which has ranged from 2.74 mg/L to 14 mg/L, is substantially greater than the other wells (all were less than 1.0 mg/L). Although, the sharp increase and maximum concentration reported in April 2004 (14 mg/L) appears anomalous. The overall increase and historical upward trend at MW−0880 may be an indication of (1) transient drainage from the disposal cell resulting from tailings material contained excess moisture at the time of placement, (2) dissipation of a legacy mound of contaminated ground water resulting from the former processing site operations (see Ground Water Level Monitoring section), or (3) the natural redistribution of uranium mineralization. The cause is ambiguous because tailings pore water is very similar chemically to the processing related contamination and ground water at other monitor wells nearby does not show similarly elevated concentrations of uranium. Local ground water is not sued for any purpose because of naturally poor quality.

Uranium concentrations in ground water in the compliance-monitoring network exceeded the MCL in all but two monitor wells, MW−0862 and MW−0886 (Figure 5–6). This is consistent with historical data, except that uranium concentrations in monitor well MW−0886 were reported above the MCL in 2004 and 2005. Additionally, 2006 results reported a sharp increase in the uranium concentration in monitor well MW−0891, from 0.059 mg/L to 0.45 mg/L. Historically, concentrations in this well have fluctuated significantly, above and below the MCL. This well is located approximately a mile from the disposal cell adjacent to a surface water drainage where the ground water level is substantially closer to the ground surface. Although the concentration of uranium in monitor well MW–0924 decreased from the prior two results, the overall increasing trend in uranium concentration in this well is likely the result of naturally occurring uranium because the pH hasn't decreased which would indicate movement of the processing related plume, particularly in this environment where uranium is highly mobile. Additionally, the uranium distribution varies spatially and the wells between well MW–0924 and the cell continue to have low concentrations.

Currently, there is no risk from site-related contamination because there is no local use of the ground water and the ground water in the uppermost aquifers beneath the site are designated as limited use (Class III). Potable (domestic) water is produced locally from the Carrizo Sandstone that lies 2,000 ft below the surface in the vicinity of the disposal site.

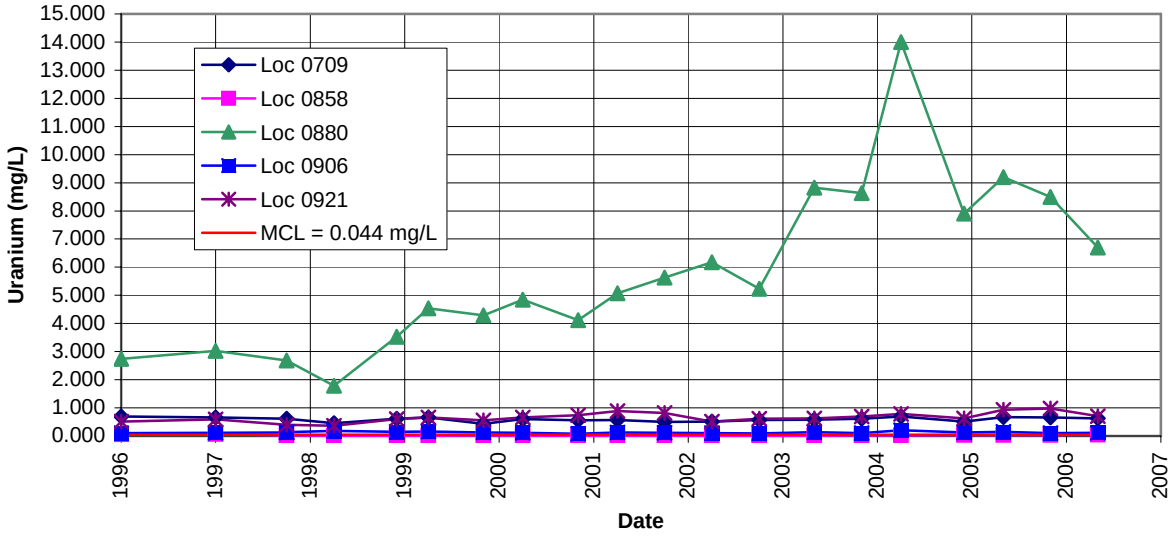


Figure 5−5. Uranium in Ground Water at Cell Performance Monitoring Locations at the Falls City, Texas, Disposal Site

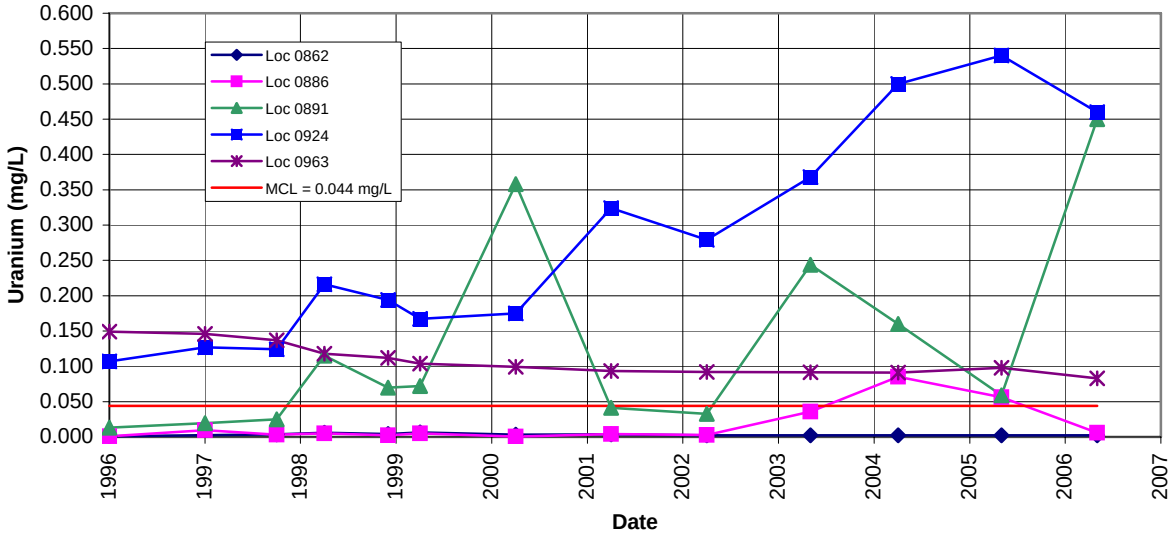


Figure 5−6. Uranium in Ground Water at Compliance Monitoring Locations at the Falls City, Texas, Disposal Site

Monitoring for the designated suite of analytes in ground water does not appear to be an effective means to assess the performance of the disposal cell because the area is affected by widespread ambient contamination (naturally occurring uranium mineralization), uranium exploration and mining, and former uranium-processing activities. Ground water in the uppermost aquifer at the site is in contact with the naturally occurring uranium deposits and associated minerals, and water that might leach from the disposal cell, either through transient drainage or percolation of precipitation through the cover, will be chemically similar and perhaps indistinguishable from ambient and otherwise impacted conditions.

In 2006, DOE evaluated the ground water monitoring program at the site, as required by the LTSP every five years, to determine if protectiveness can be demonstrated with reduced monitoring requirements, such as sampling fewer wells, analyzing fewer constituents, and sampling the cell performance wells annually or biennially instead of every six months. Based on the evaluation's recommendations, DOE revised the LTSP for NRC approval; submittal of the
5E revised draft LTSP to the NRC is planned in early 2007. The revised draft LTSP specifies continued monitoring of the current network of wells annually for the next five years as a best management practice, reducing the analyte list to total uranium, and performing field measurements of temperature, pH, conductivity, turbidity, alkalinity, dissolved oxygen, and oxidation-reduction potential. Monitoring results will be reevaluated in five years.

Ground Water Level Monitoring—Ground water levels in the wells near the disposal cell used to monitor cell performance initially declined by several feet for the first few years following construction with one exception: monitor well MW–0906 fluctuated up and down several feet before rising and exhibiting an historical upward trend (Figure 5–7). This well is also the only well displaying an historical slightly upward trend; the remaining wells displayed fluctuations following an initial decline, but historically display a slight downward trend. Monitor well MW–0906 is located directly downgradient of the disposal cell, and the historical slightly upward trend is likely the result of localized mounding from water being shed from the disposal cell, as indicated by more than a five foot increase in the level from initial post-construction levels through May 2005, but also could reflect transient drainage from the disposal cell. More recently (for the last two years), downward levels have been reported in monitor well MW–0906, which is consistent with all other wells, and collectively most likely represents drought conditions that occurred in 2005. Other likely contributors to these recent downward levels include (1) dissipation of the processing site-related ground water mound beneath the disposal cell, and (2) dissipation of transient drainage from the disposal cell. Monitor wells MW–0908 and MW–0916, completed in the unsaturated zone of the Conquista Sandstone, have been dry at the time of sampling since 1996.

In contrast, water levels at the ground water compliance monitoring locations have all steadily increased several feet since monitoring began in 1996, indicating a regional effect; although, all but one well (MW–0886) also show recent downward levels, that again, likely represents drought conditions that occurred in 2005 (Figure 5–8).

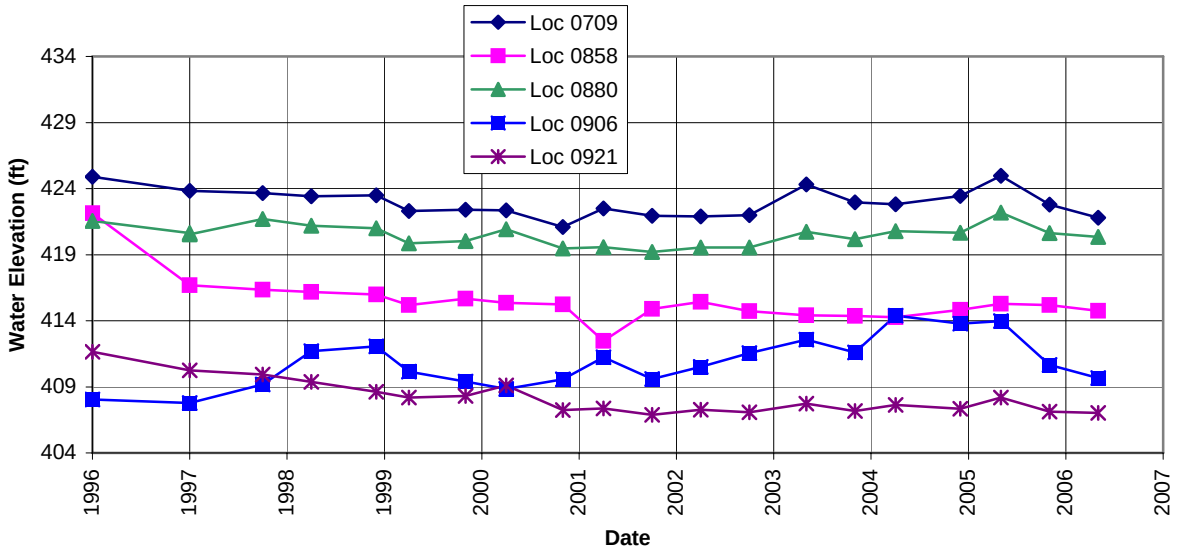


Figure 5−7. Water Level Measurements at Cell Performance Monitoring Locations at the Falls City, Texas, Disposal Site

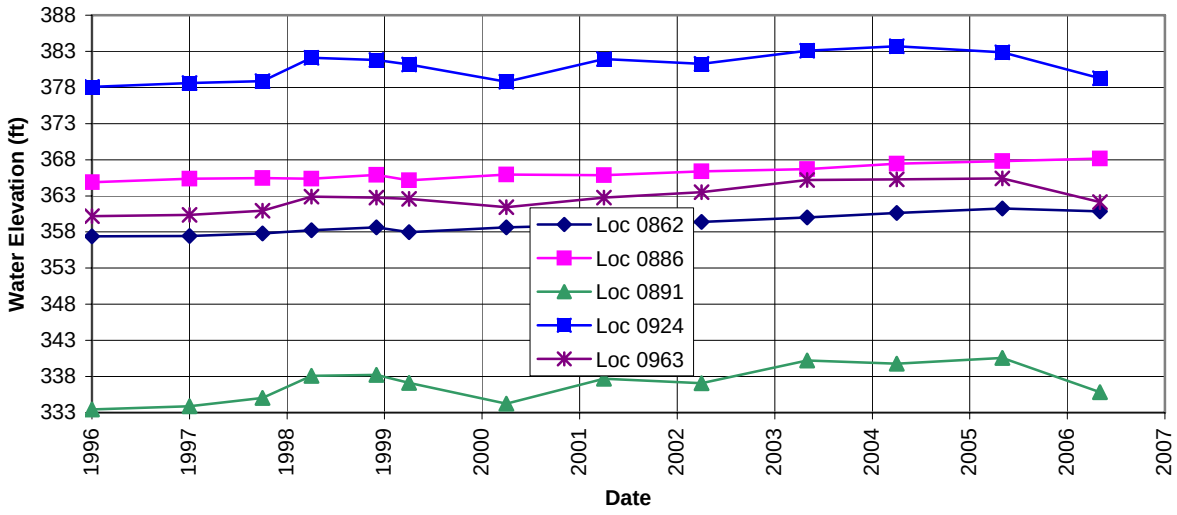


Figure 5−8.Water Level Measurements at Ground Water Compliance Monitoring Locations at the Falls City, Texas, Disposal Site

5.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

5.3.6 Photographs

Table 5–3. Photographs Taken at the Falls City, Texas, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	140	New vehicle gate, north corner of the site.
PL–2	215	New perimeter fence on northwest property boundary.
PL−3	235	Perimeter sign P20; damaged.
PL−4	180	Top slope of the disposal cell showing well established grass cover.
PL−5	225	Undesirable vegetation on northeast side slope.
PL−6	345	State of Texas inspector collecting gamma exposure rates.

FCT 1/2006. PL–1. New vehicle gate, north corner of the site.

FCT 1/2006. PL–2. New perimeter fence on northwest property boundary.

FCT 1/2006. PL–3. Perimeter sign P20; damaged.

FCT 1/2006. PL–4. Top slope of the disposal cell showing well established grass cover.

FCT 1/2006. PL–5. Undesirable vegetation on northeast side slope.

FCT 1/2006. PL–6. State of Texas inspector collecting gamma exposure rates.

End of current section.

6.0 Grand Junction, Colorado, Disposal Site

6.1 Compliance Summary

The Grand Junction Disposal Site, inspected on March 23, 2006, was in good condition. A portion of the disposal cell remains open and is operated by DOE to receive additional low-level radioactive waste materials from various sources. The annual inspection addresses only the closed and completed portion of the disposal cell and surrounding disposal site.

Additional work was performed to the east storm water retention pond to prevent continued saturation of an adjacent site access road during storm water runoff events. Several missing or damaged signs were replaced. Deep-rooted shrubs on the cell top and the tamarisk found on site were cut and treated with herbicide. Ground water monitoring was performed as a best management practice to assess the performance of the disposal cell. There was no cause for a follow-up or contingency inspection.

6.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Grand Junction, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Interim Long-Term Surveillance Plan* [LTSP] *for the Cheney Disposal Site Near Grand Junction, Colorado* (DOE/AL/62350–243, Rev. 1, U.S. Department of Energy [DOE], Albuquerque Operations Office, April 1998), and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 6–1.

Table 6–1. License Requirements for the Grand Junction, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 6.3.1
Follow-up or Contingency Inspections	Section 3.0	Section 6.3.2
Routine Maintenance and Repairs	Sections 2.7.3 and 4.0	Section 6.3.3
Ground Water Monitoring	Section 2.6	Section 6.3.4
Corrective Action	Section 5.0	Section 6.3.5

Institutional Controls—The 360-acre disposal site is owned by the United States of America. A portion of the disposal cell remains open to receive additional low-level residual radioactive material (RRM) generated under the UMTRCA program. Weekly inspections of the active portion of the site are performed to verify the site is secure, and radon is monitored continuously to ensure the open portion of the cell is protective of human health and the environment. This portion of the disposal cell is scheduled to remain open until 2023, or until filled to its design capacity, at which time it will be closed in accordance with design criteria. Upon concurrence with the final closure of the open portion of the cell and the final version of the LTSP, the site will be accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27). DOE will then become the licensee and, in accordance with the requirements for UMTRCA Title I sites, will be responsible for the custody and long-term care of the site. The open and active portion of the disposal cell within the closed but unlicensed portion of the disposal cell makes the Grand Junction Disposal Site unique among the 19 UMTRCA Title I disposal sites.

DOE currently is, and will remain, the disposal site operator until final closure. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site access road. Verification of these institutional controls is part of the annual inspection.

6.3 Compliance Review

6.3.1 Annual Inspection and Report

The site, located south of Grand Junction, Colorado, was inspected on March 23, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 6–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

Only closed and completed parts of the disposal cell and surrounding disposal site are addressed during the annual inspection. The open cell, occupying approximately 21 acres in the center of the disposal cell, the temporary structures associated with its operation, and the temporary contaminated material stockpile areas, are not formally inspected except as they may affect the long-term safety and performance of the closed portion of the disposal cell.

6.3.1.1 Specific Site Surveillance Features

Site Access Gate, Access Road, Entrance Gate and Fence—The site access gate is a steel, double-swing stock gate that is secured by a chain and DOE padlock. The gate, in excellent condition, controls access to the site from U.S. Highway 50. A paved all-weather access road extends approximately 1.7 miles east along DOE's perpetual right-of-way, through federal land administered by the U.S. Bureau of Land Management (BLM), to the site entrance gate. Damaged portions of the road were patched with asphalt in 2005. No erosion problems were observed along the access road. Periodic maintenance will be required because disposal operations will continue for many years. The fence along the right-of-way corridor is in excellent condition; repairs were made during fall 2004 due to damage by livestock. The site entrance gate is a double-swing chain link gate and is secured by a DOE padlock keyed the same as the site access gate; this gate also is in excellent condition.

Security incidents have occurred at the site in recent past years that were reported to the local authorities. In late 2004, the lock on the site access road gate was found damaged by gunshots and replaced. In early 2005, a break-in occurred at the site and tools were stolen from a storage building. No damage to the disposal cell or other features at the site occurred. In 2006, only a couple of missing signs were noted.

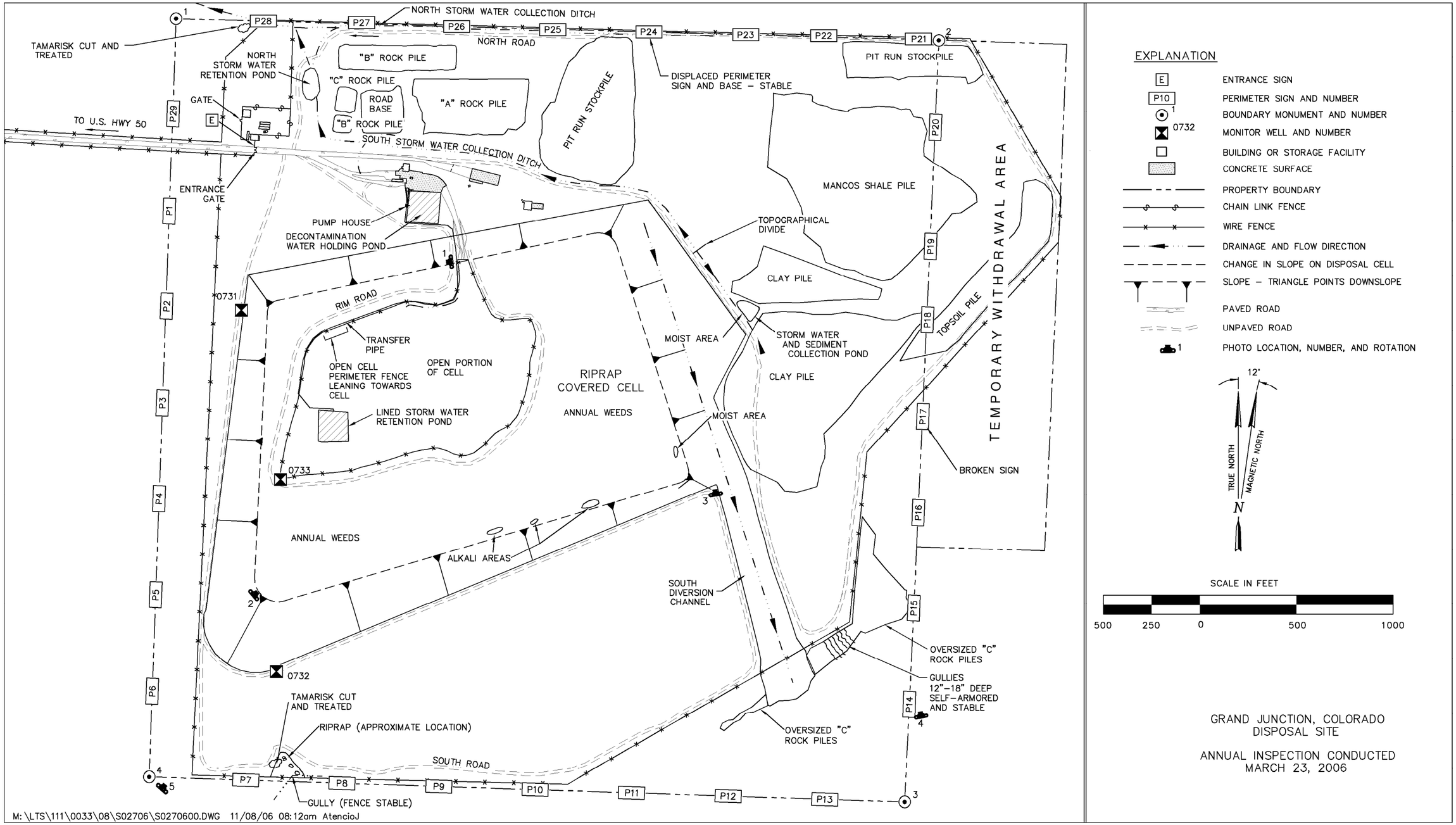


Figure 6–1. 2006 Annual Compliance Drawing for the Grand Junction, Colorado, Disposal Site

Entrance and Perimeter Signs— An entrance sign is located at the entrance gate, and 29 perimeter signs are located at regular intervals along the DOE property boundary. The signs are installed on galvanized steel posts set in concrete. Perimeter sign P17 was broken in half and
6A replaced. All of the other perimeter signs and the entrance sign were in excellent condition. The base of perimeter sign P24 was slightly displaced when hit by road grading equipment but remains stable.

Additional warning signs are posted on the wire perimeter fence and are associated with the operation of the open cell. Metal "Controlled Area" signs and yellow plastic "No Trespassing" signs are secured to the fence in pairs. There are 75 warning sign locations, each about 200 feet apart along the site boundary. Several of the signs were found missing or damaged and were replaced.

Site Marker and Boundary Monuments—Granite site markers will not be installed at this site until the entire disposal cell is closed.

The site has four permanent boundary monuments, one at each of the four corners. The monuments mark the exact location of the site corners. All were in excellent condition.

Monitor Wells—The ground water monitoring network consists of three monitor wells. All three wells are inside the site boundary. The wells were secure and in excellent condition.

6.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into five areas referred to as transects: (1) the closed portion of the disposal cell; (2) the diversion structures and drainage channels; (3) the area between the disposal cell and the site boundary; (4) the site perimeter; and (5) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Closed Portion of the Disposal Cell—The top and side slopes of the disposal cell are covered with basalt riprap. The rock is durable and was in excellent condition. There was no evidence of slope instability and only minor plant encroachment occurring on the side slopes (PL–1).

Storm water runoff drains toward the southeast corner of the cell. Several moist areas with evaporite deposits were observed. The moist areas typically have a higher percentage of fine particles at the surface than the remainder of the cover and are the result of recent precipitation events. There was no evidence of settling or erosion of the cell cover.

Annual grasses and weeds grow on most of the cell cover (PL–2), and scattered deep-rooted shrubs (primarily four-winged saltbush and rabbitbrush) have been persistent on the cover. The annual grasses and weeds have shallow root systems and do not degrade cell cover performance. As stated in the LTSP, however, the deep-rooted shrubs potentially could pose a threat to the

long-term integrity of the radon barrier and are required to be removed. All the deep-rooted
6B shrubs that were found were cut and their stems were sprayed with herbicide. A preliminary study of the in situ saturated conductivity of the cover materials was conducted at four test locations in 2003 to see if the root systems of four-winged saltbush shrubs increased infiltration through the radon barrier. The results were not definitive and a follow-up investigation of the cover materials may be desirable to determine whether the deep-rooted shrubs need to be removed periodically or if leaving them in place would not change (or would improve) the function of the radon barrier in preventing infiltration of water into and the release of radon gas from the encapsulated materials. Vegetation growth on the cell also would likely provide additional erosion protection. However, unless it is determined that the shrubs can remain, they will be periodically removed.

Diversion Structures and Drainage Channels—The south diversion channel, a large riprap-armored structure that conveys storm water runoff from the disposal cell southeast into a natural drainage that flows away from the site to the southwest. The diversion channel was in excellent condition. Some minor vegetation growth, including annual grasses and weeds and some deep-rooted shrubs, exists within the channel; however, there was not enough growth to impede water flow within the channel (PL–3). Erosional features at the outfall of the channel are self-armoring with large riprap boulders and are stable.

Other drainage features at the site include north and south storm water collection ditches, the north storm water retention pond, and a storm water and sediment collection pond on the east side of the south diversion channel. These drainage features control storm water runoff primarily from the various cover materials stockpiled on the northern and eastern portions of the disposal site property. The north storm water collection ditch also captures run-on storm water from a large catchment area north and east of the disposal site. The drainage ditches and the north storm water retention pond were functioning as designed. The east pond deepened in 2005 to prevent continued saturation of the adjacent access road during runoff events, required additional
6C maintenance in 2006 to retain the ponded water. Accumulations of sediment and tumbleweeds were observed in both ditches. Occasional maintenance (i.e., blading) of the ditches may also be required if flows are impeded or obstructed. The drainage ditches and the north storm water retention pond were functioning as designed.

Area Between the Disposal Cell and the Site Boundary—There are 12 discrete stockpiles of rock and soil between the disposal cell and the site boundary on the north and east sides of the disposal cell (PL–4). These materials eventually will be used to cover and close the open portion of the cell. The natural vegetation was becoming well established that is protecting the stockpiles from significant erosion.

On the south and west sides of the disposal site, between the disposal cell and the perimeter fence, the ground is relatively flat and covered with native vegetation that consists primarily of perennial grasses and small shrubs (PL–5). Unlike the areas north and east of the disposal cell, the areas south and west are mostly undisturbed. No erosion was observed south and west of the disposal cell within the site. A small erosional area was present along the site boundary between the perimeter fence and a wash near the south diversion channel outfall. The gullies in this area were found to be self-armoring with basaltic rock and appeared to be stable.

Tamarisk is a deep-rooted, water-depleting noxious weed that is recommended for removal in Mesa County. Isolated stands of tamarisk were found growing along the south side and northwest corner of the site and were removed. Although the plants do not threaten the integrity or performance of the disposal cell, they were cut and treated with herbicide to remove the seed source to reduce the chance of the plants from spreading and establishing on the disposal cell.

6D

Site Perimeter—The perimeter fence surrounding the site consists of a combination of square wire mesh at the bottom and two strands of barbed wire along the top, both supported by steel t-posts. The fence was in good condition and there was no evidence of livestock entering the enclosed area.

The fence runs along or near the property line on the north and south sides of the site, about 200 to 300 feet inside the property line on the west, and as much as 1,000 feet inside at the southeast corner of the site. On the east side, the fence extends beyond the site boundary to enclose part of an adjoining 40-acre temporary withdrawal area that is federal land administered by BLM. The temporary withdrawal area is not included in the interim LTSP and, therefore, is not formally inspected. DOE uses the temporary withdrawal area to stockpile cover materials for the eventual closure of the open portion of the cell.

A gully has developed along the south perimeter fence (near perimeter sign P8) on the fringe of a riprap-armored drainage area. The gully is encroaching on the fence line and at some point may erode beneath one or more of the line posts; however, the fence and posts were taut and secure at the time of the inspection.

Outlying Area—The area outward from the disposal site for a distance of 0.25 mile was visually inspected. No development or disturbance that could affect the disposal site was observed. Most of the land surrounding the site is rangeland administered by BLM. The land is covered by native grass and shrubs, and is used primarily for cattle grazing.

6.3.2 Follow-up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

6.3.3 Routine Maintenance and Repairs

In 2006, replaced site perimeter and warning signs, additional maintenance was performed to retain ponded water in the east retention pond, and deep-rooted plants on the cell and tamarisk on site were cut and treated.

6.3.4 Ground Water Monitoring

Monitoring of ground water in the uppermost aquifer (Dakota Sandstone) beneath the disposal site is not required because the ground water is of limited use, based on the total dissolved solids

(TDS) content exceeding 10,000 milligrams per liter (mg/L) (40 CFR Part 192.21(g)). Confined ground water in the uppermost aquifer lies approximately 750 feet below the existing ground surface and is hydrogeologically isolated from the tailings material by mudstones and shales of the Mancos Shale.

In lieu of monitoring ground water in the uppermost aquifer, DOE monitors ground water as a best management practice in two monitor wells in or very near buried alluvial paleochannels
6E adjacent to the disposal cell (MW−0731 and MW−0732) and one monitor well in the disposal cell (MW−0733) to assess performance of the disposal cell and to ensure that any ground water in the paleochannels is not impacted by seepage (transient drainage) from the disposal cell (Table 6–2). The paleochannel wells are along the west (downgradient) edge of the disposal cell and are screened at the interface between the alluvium and shallow Mancos Shale. The third well is in the southwest corner of the open portion of the disposal cell and is used primarily for measurement of water levels in the deepest part of the disposal cell to demonstrate that ground water directly beneath the disposal cell has not risen high enough to move laterally into the paleochannels.

Table 6–2. Ground Water Monitoring Network at the Grand Junction, Colorado, Disposal Site

Monitor Well	Hydrologic Relationship
MW−0731	Paleochannel, downgradient, edge of cell, north side
MW−0732	Paleochannel, downgradient, edge of cell, south side
MW−0733	Disposal cell, deepest location, downgradient, center

Ground Water Level Monitoring—Static water level measurements are obtained from each well prior to the collection of water quality samples (Figure 6–2). In September 2006, data loggers were installed in each well to obtain continuous water level measurements (4 hour interval).

The water level in the disposal cell well MW−0733 has displayed a steady continual rise, although relatively minor; approximately 2 feet of increase since 1998. In comparison, water levels within the two paleochannels at wells MW−0731 and MW−0732 have displayed a decrease, although more varied and larger; approximately 4 to 5 feet of decrease since 1998. Still the water level in the disposal cell well MW−0733 has remained significantly deeper than water levels in the paleochannels at wells MW−0731 and MW−0732, respectively, since 1998 (Figure 6–2).

On the basis of this information, there is no hydraulic potential for ground water at the base of the disposal cell at well MW−0733 to migrate to the paleochannels at wells MW−0731 and MW−0732.

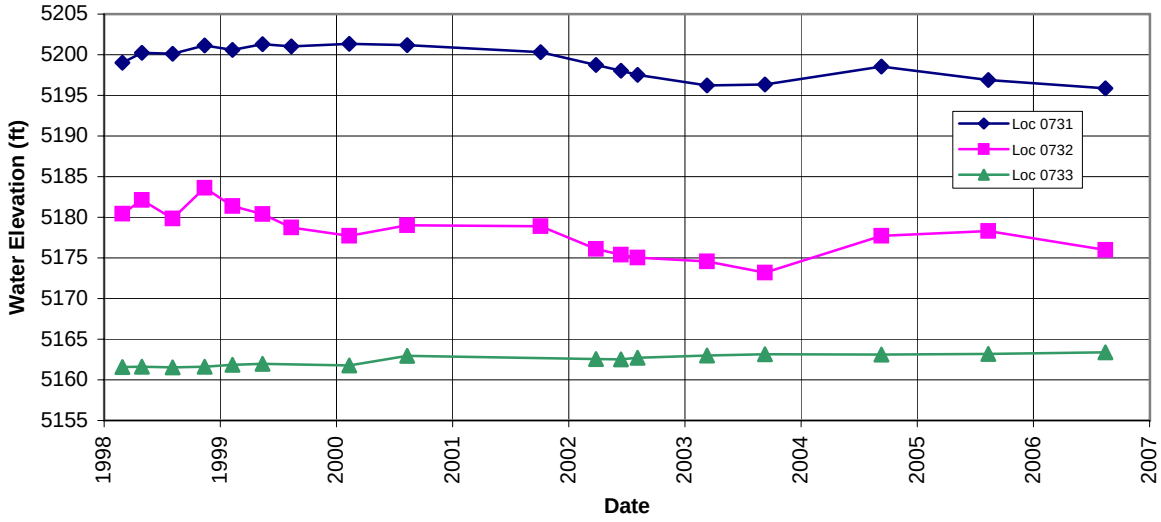


Figure 6−2. Water Level Measurements at the Grand Junction, Colorado, Disposal Site

Ground Water Quality Monitoring—Ground water samples are analyzed for standard field parameters and the following indicator analytes: molybdenum, nitrate, selenium, sulfate, TDS, uranium, vanadium, and polychlorinated biphenyls (PCBs). Key indicator analytes are molybdenum, nitrate, selenium, and uranium. In 40 CFR 192 Table 1 in Subpart A, the U.S. Environmental Protection Agency (EPA) has established maximum concentration limits (MCLs) for these analytes in ground water (Table 6–3). Time-concentration plots, from 1998 through 2005, for three key indicator analytes—nitrate (as nitrogen), selenium, and uranium are shown on Figures 6−3 through 6−5.

Table 6–3. Maximum Concentration Limits for Ground Water at the Grand Junction, Colorado, Disposal Site

Constituent	MCL [a] (mg/L)
Molybdenum	0.1
Nitrate (as N)	10
Selenium	0.01
Uranium	0.044

[a]EPA MCLs as listed in 40 CFR 192 Table 1, Subpart A.
MCL = maximum concentration limit.
Mg/L = milligrams per liter.

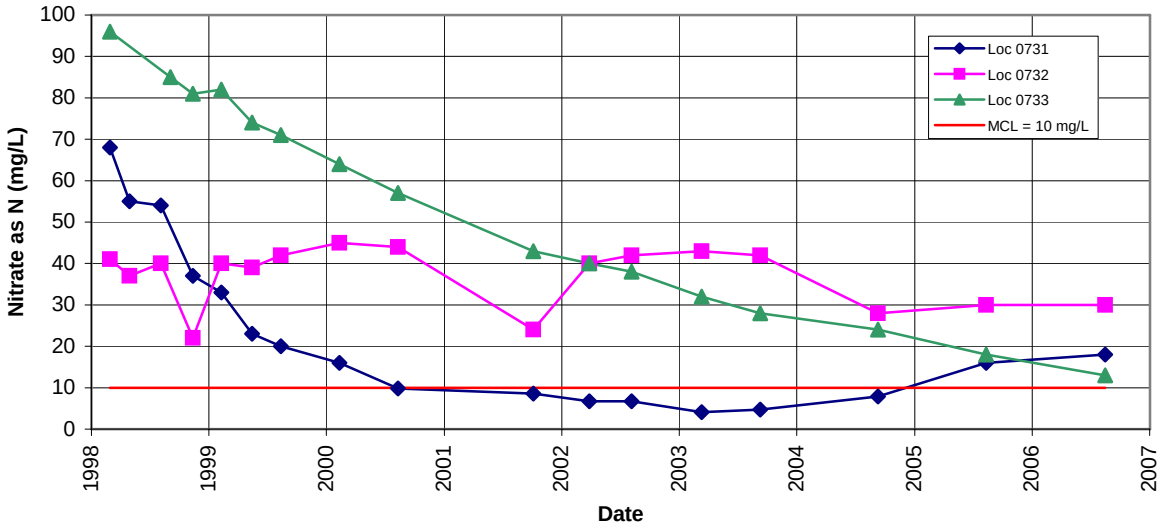


Figure 6−3. Time-Concentration Plots of Nitrate (as N) in Ground Water at the Grand Junction, Colorado, Disposal Site

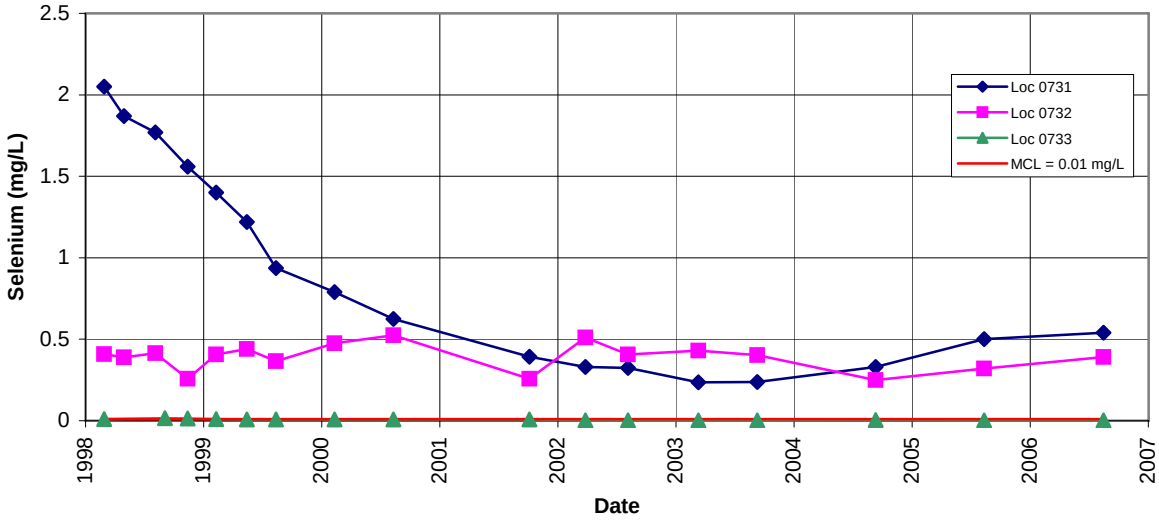


Figure 6−4. Time-Concentration Plots of Selenium in Ground Water at the Grand Junction, Colorado, Disposal Site

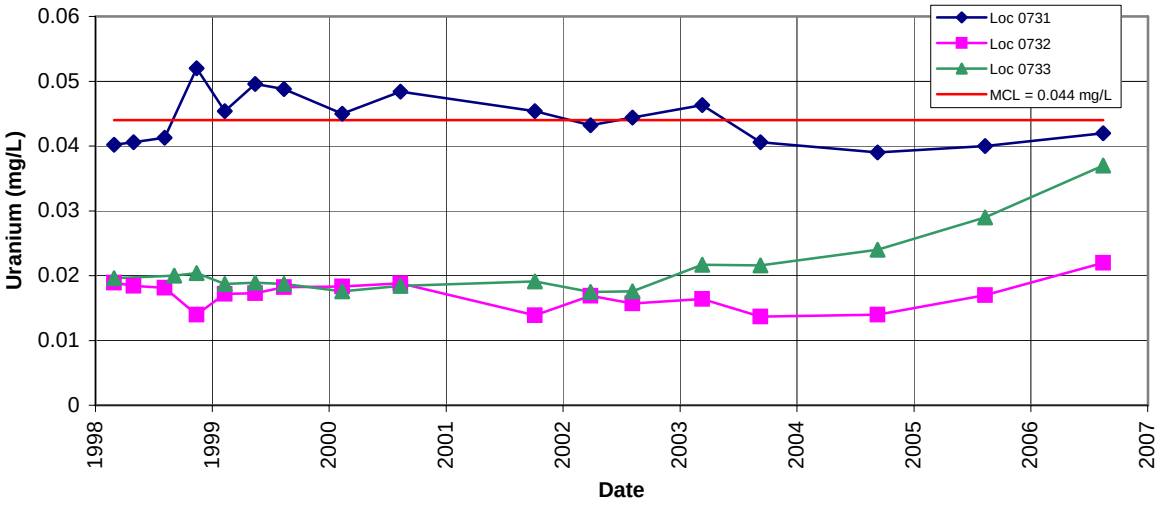


Figure 6−5. Time-Concentration Plots of Uranium in Ground Water at the Grand Junction, Colorado, Disposal Site

Results from sampling in 2006 were generally consistent with results from the past several years.

Nitrate (as nitrogen) concentrations in ground water exceeded the MCL of 10 mg/L in all three monitor wells. Concentrations in well MW–0731, following an initial steep downward trend, remained below the MCL from 2000 through 2004. In 2005, and continuing in 2006, concentrations were above the MCL. Concentrations in well MW–0732, although varied, have consistently remained above the MCL since 1998. Concentrations in well MW–0733 continue a significant downward trend to just slightly above the MCL in 2006 (Figure 6–3). In 2006, the highest concentration of nitrate, 30 mg/L, occurred in paleochannel well MW–0732. Historically, the highest concentration of nitrate (96 mg/L) occurred in 1998 from the disposal cell well MW–0733.

Selenium levels continued to exceed the MCL of 0.01 mg/L in both paleochannel wells MW–0731 and MW–0732, and remained well below the standard in MW–0733 in the disposal cell (Figure 6–4). Concentrations in well MW–0731 initially displayed a sharp decreasing trend, with the decreasing trend continuing until 2003, at which time a slight upward trend began. Concentrations in both wells MW–0732 and MW–0733 have remained relatively consistent, although, more fluxuation can be observed in MW–0732. In 2006, the highest concentration of selenium, 0.54 mg/L, occurred in paleochannel well MW–0731 and compares to an historical high of 2.05 mg/L in 1998 from the same well. These concentrations can be expected as selenium levels are typically elevated in sediments of the Mancos Shale in the area.

Uranium concentrations in ground water were below the MCL of 0.044 mg/L in all three monitor wells (Figure 6–5). Concentrations in wells MW–0732 and MW–0733 remained relatively consistent through 2003, at which time an upward trend began in both wells. Concentrations in

well MW–0731, although varied, have not significantly changed since 1998. In 2006, the highest concentration of uranium, 0.042 mg/L, occurred in paleochannel well MW–0731 and compares to an historical high of 0.052 mg/L in 1998 from the same well.

Molybdenum concentrations in ground water continued to be near the required laboratory detection limit and significantly below the MCL of 0.1 mg/L in all wells.

Concentrations of PCBs were not detected in any of the wells.

6.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

6.3.6 Photographs

Table 9–2. Photographs Taken at the Grand Junction, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	265	North side slope of the disposal cell.
PL–2	50	Cell top viewed from the southwest corner of the disposal cell.
PL–3	350	South diversion channel viewed from the southeast corner of the disposal cell.
PL–4	350	Riprap stockpile area near the southeast corner of the disposal site.
PL–5	40	Disposal cell viewed from the southwest corner of the disposal site.

GRJ 3/2006. PL–1. North side slope of the disposal cell.

GRJ 3/2006. PL–2. Cell top viewed from the southwest corner of the disposal cell.

GRJ 3/2006. PL–3. South diversion channel viewed from the southeast corner of the disposal cell.

GRJ 3/2006. PL–4. Riprap stockpile area near the southeast corner of the disposal site.

GRJ 3/2006. PL–5. Disposal cell viewed from the southwest corner of the disposal site.

End of current section.

7.0 Green River, Utah, Disposal Site

7.1 Compliance Summary

The Green River Disposal Site, inspected on March 21, 2006, was in excellent condition. Despite several significant rainfall events in 2005 and 2006, all surveillance features at the site remain stable and in excellent condition. Ground water monitoring continued in 2006 for the purpose of evaluating cell performance. No cause for maintenance or a follow-up inspection was identified; however, the site was visited several times in 2006 to verify that the site was not experiencing erosion problems due to heavy rainfall.

7.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Green River, Utah, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Green River, Utah, Disposal Site* (DOE/AL/62350–89, Rev. 2, U.S. Department of Energy [DOE], Albuquerque Operations Office, July 1998) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 7–1.

Table 7–1. License Requirements for the Green River, Utah, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 7.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 7.3.2
Routine Maintenance and Repairs	Section 8.0	Section 7.3.3
Ground Water Monitoring	Section 5.2	Section 7.3.4
Corrective Action	Section 9.0	Section 7.3.5

Institutional Controls—The 25-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1998. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter security fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site security fence. Verification of these institutional controls is part of the annual inspection.

7.3 Compliance Review

7.3.1 Annual Inspection and Report

The site, located southeast of Green River, Utah, was inspected on March 21, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 7–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

7.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Gate, Fence, and Signs—Access to the site is south from Green River on Utah State Highway 191 onto a county owned frontage road and across state land and U.S. Army property. The site lies north of U.S. Interstate Highway 70 across a short track of Army property. Entrance to the site is through a locked steel gate in the stock fence along the paved road. Past this gate, a short track leads across state land to the disposal cell, which is enclosed within a chain link security fence. The chain link fence is set back between 50 and 250 feet from the site boundary. Two vehicle access gates are installed in this fence at the south and east corners of the fence line. A personnel gate is at the north corner of the fence line. The security fence and gates were in excellent condition.

One entrance sign and 17 perimeter signs are positioned on posts set along the unfenced site boundary. Perimeter sign P12 has a bullet dent but is legible; the remaining signs were in excellent condition.

Site Markers and Monuments—The two granite site markers, 11 boundary monuments, and three survey monuments were in excellent condition.

Monitor Wells—The ground water monitoring network consists of four point-of-compliance wells northwest of the disposal cell (MW–0171, MW–0172, MW–0173, and MW–0813). An additional well offsite (MW–0179) is used for monitoring the aquifer water level. These wells were secure and in excellent condition. DOE owns additional wells in the site vicinity (not shown on Figure 7−1) that are used for developing a ground water compliance strategy.

7.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the disposal cell and adjacent area inside the security fence; (2) the site perimeter between the security fence and the site boundary; and (3) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes.

Disposal Cell and Adjacent Area Inside the Security Fence—The slopes of the disposal cell cover are armored with riprap (PL–1). The cell cover was in excellent condition. The riprap apron along the base of the disposal cell on all sides was in excellent condition.

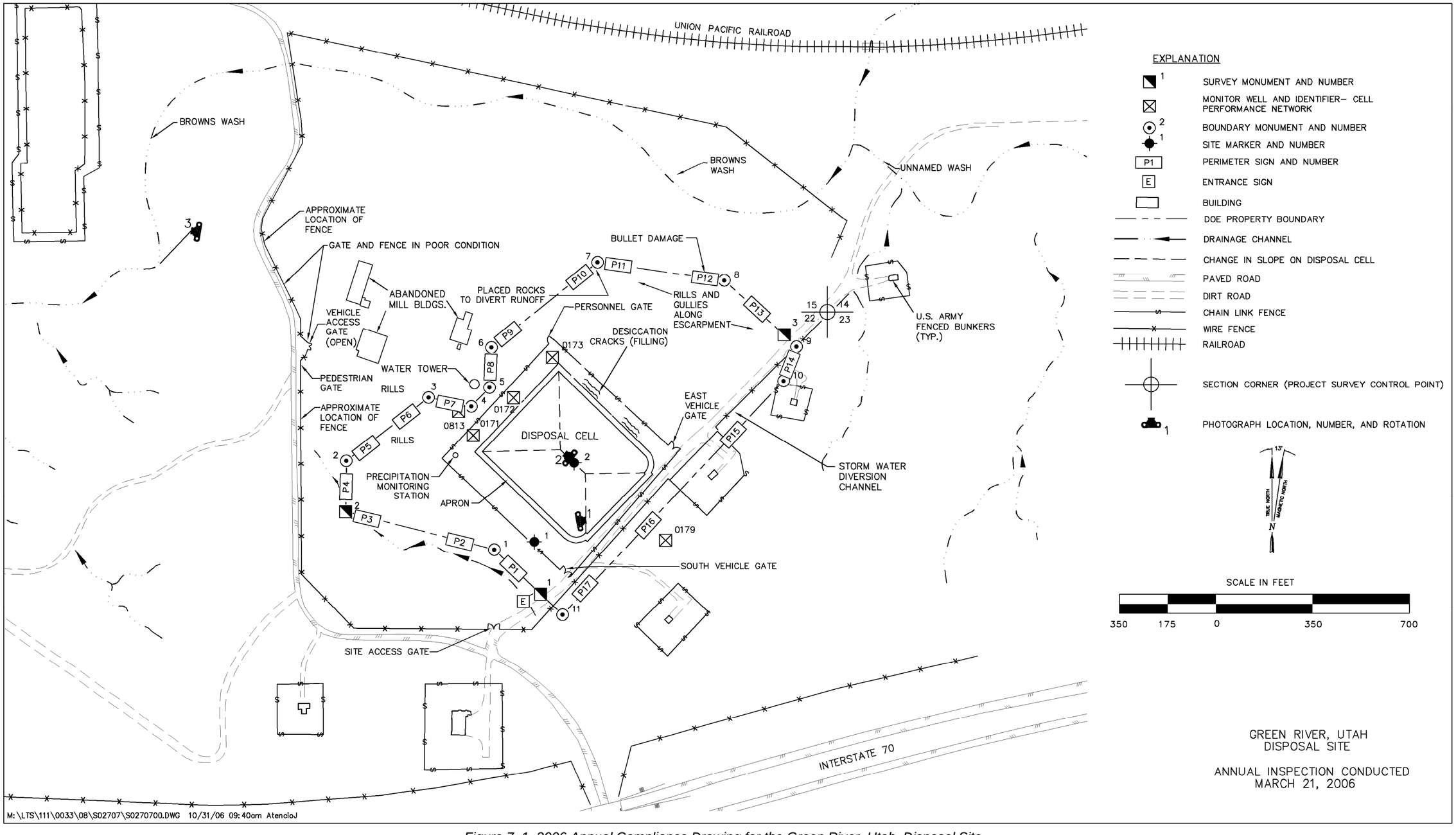


Figure 7–1. 2006 Annual Compliance Drawing for the Green River, Utah, Disposal Site

Site Perimeter Between the Security Fence and the Site Boundary—Rills and gullies are present on the west side of the property but do not pose a threat to the integrity of the cell and currently are not impacting any site surveillance features. Rills and gullies are also present along the escarpment northeast of the disposal cell in the area between boundary monument BM–7 and survey monument SM–3. Maximum gully depth in this area is approximately 3 feet. The rill and gully erosion poses no threat to the integrity of the disposal cell but could eventually damage perimeter signs and boundary monuments. Sediment discharging from a gully is encroaching on boundary monument BM–7, so rocks were placed in the gully to divert runoff around the monument.

A barbed-wire stock fence on the surrounding State-owned property is in poor condition, and an access gate through the fence to abandoned mill buildings northwest of DOE property was heavily damaged and open. Tracks indicate that vehicles enter the gate and cross DOE property to access areas northeast of the site. However, there was no evidence of vandalism to site surveillance features. Because DOE does not have a responsibility to maintain the barbed-wire fence and gate, trespassing onto DOE property is difficult to control. DOE will continue to monitor for evidence of vandalism at the site.

Outlying Area—The area extending outward from the site for a distance of 0.25 mile was checked for signs of erosion, development, or other disturbance that might affect site security or integrity. Areas of erosion noted during recent and previous inspections include the natural drainage southwest of the site and rills and gullies northwest of the water tower. Minor erosion continues but currently does not pose a threat to the integrity of the disposal cell or site surveillance features.

Abandoned buildings associated with milling activities at the Green River processing site are located northwest and upwind of the DOE property (PL–2). The buildings are in a severe state of disrepair and debris (e.g., roofing materials, siding, trash) tends to be blown from the buildings onto DOE property. Accumulation of building materials blown onto DOE property was not significant, but will continue to be monitored and debris will be removed as necessary.

The alluvium in the bottom of Browns Wash was moist and standing water was present in clay-lined scour holes immediately downstream of outcrops of the Cedar Mountain Formation in the channel bottom (PL–3). This location is projected for compliance monitoring because the outcrops have been identified as a potential discharge location for the Cedar Mountain Formation aquifer (the aquifer is contaminated under the disposal site from former processing site operations). However, as noted in several site visits during 2005 and 2006, the standing water was the result of recent runoff in the wash and dewatering of the stream bed and banks. There is no visual evidence that ground water is seeping from the bedrock outcrops because the outcrops are dry within a few days of the latest runoff event and no wetland vegetation indicative of a shallow and continuous water supply is present at the outcrop locations.

7.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006. The site was visited several times in 2006 following heavy rainfall events to verify that erosion is not affecting the site surveillance features and to monitor the condition of Browns Wash.

7.3.3 Routine Maintenance and Repairs

No maintenance or repairs were performed at the disposal site in 2006.

7.3.4 Ground Water Monitoring

7A DOE currently is monitoring ground water in four point-of-compliance wells in the uppermost aquifer downgradient from the disposal cell. These four point-of-compliance wells are MW−0171, MW−0172, MW−0173, and MW−0813. The purpose of the monitoring is to evaluate the performance of the disposal cell. Ground water samples are collected quarterly, and are monitored for three target analytes—nitrate, sulfate, and uranium, as stipulated in the LTSP. Arsenic and selenium are also monitored because of concentrations that exceed U.S. Environmental Protection Agency maximum concentration limits (MCL) provided in 40 CFR 192 Table 1 of Subpart A. Water levels are measured in the point-of-compliance wells and in offsite monitor well MW−0179.

7B Based on the evaluation of several years of analytical data and associated risk, the alternate concentration limits (ACL) listed in Table 7-2 have been proposed to NRC and the State of Utah in the draft *Preliminary Final Ground Water Compliance Action Plan for the Green River, Utah, (UMTRCA Title I) Disposal Site (GCAP)*. If accepted, these proposed ACLs will be applicable to all point-of-compliance wells. An ACL is not proposed for sulfate because there is currently no primary drinking water standard for that constituent. DOE has received comments to the draft GCAP from the State of Utah and is evaluating them.

Table 7–2. Proposed Alternate Concentration Limits for Point-of-Compliance Wells at the Green River, Utah, Disposal Site

Constituent	MCL (mg/L)	Proposed ACL (mg/L)
Arsenic	0.05	5.0
Nitrate (as N)	10	1,000
Selenium	0.01	1.0
Uranium	0.044	4.4

Key: ACL = alternate concentration limit; MCL = maximum concentration limit; mg/L = milligrams per liter

Samples were collected quarterly for 3 years beginning in 1998 with the provision that monitoring requirements would be reevaluated in 2001 to determine if contaminant levels in ground water decreased, as expected, to levels that existed prior to construction of the disposal cell. The evaluation report concluded that concentrations were within a reasonable range of compliance relative to the proposed concentration limits provided in the LTSP. However, it is understood that the presence of preexisting processing-related ground water contamination in the disposal cell vicinity complicates the assessment of disposal cell performance. In addition, changes in concentration levels unrelated to disposal cell performance may occur at the site as a result of preexisting contamination.

As a result of the evaluation, quarterly monitoring of the four point-of-compliance wells has continued pending approval of the site-wide compliance strategy and monitoring program. In the interim, it has been determined there is no potential impact to human health and the environment as a result of site-related contamination in ground water in the vicinity of the Green River site because the ground water is not used and the river water is unaffected by site contaminants.

Ground Water Quality Monitoring—Time-concentration plots for the period 1998 through June 2006 for the three target analytes—nitrate, sulfate, and uranium, as well as for arsenic and selenium, are shown on Figures 7−2 through 7−6.

Concentrations of nitrate in ground water continued above the MCL of 10 mg/L but are considerably below the proposed ACL of 1,000 mg/L except in well MW−0813, where values continue near the laboratory detection limit (Figure 7–2). Since 1998, concentrations in wells MW–0171 and MW–0813 have remained essentially constant, while there has been a downward trend for well MW–0172 since 1998 and a downward trend for well MW–0173 since the beginning of 2003.

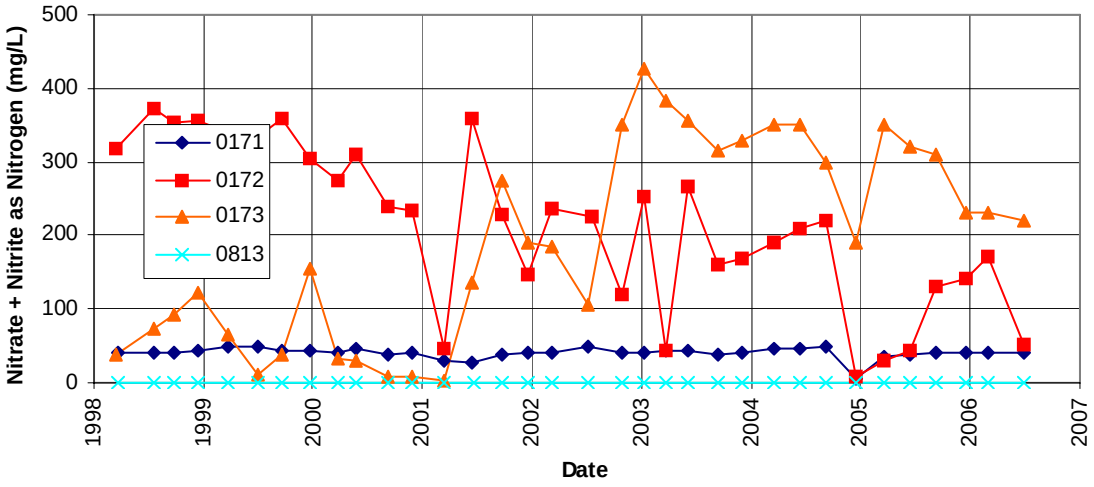


Figure 7−2. Time-Concentration Plots of Nitrate in Ground Water at the Green River, Utah, Disposal Site

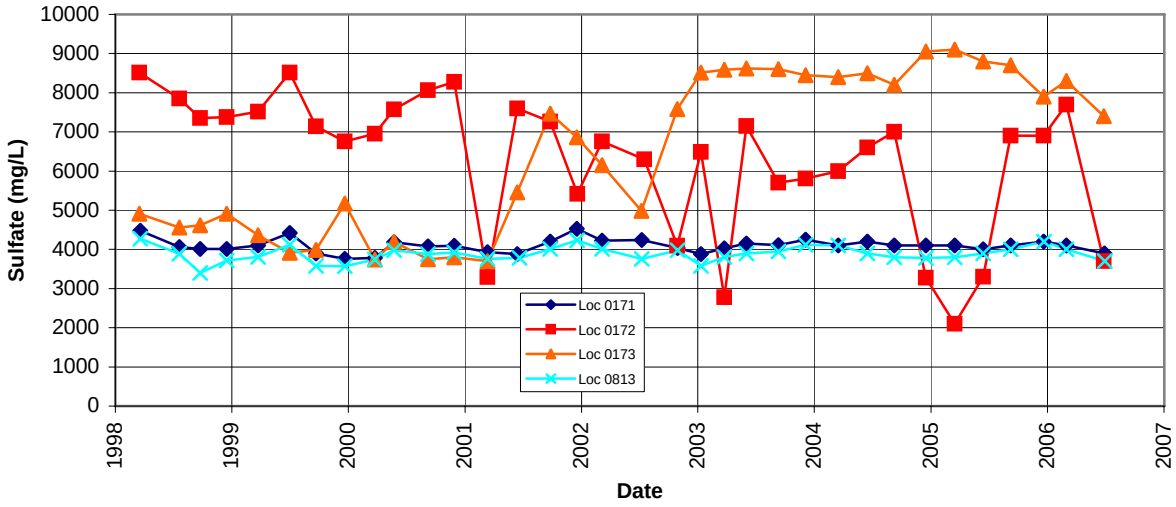


Figure 7−3. Time-Concentration Plots of Sulfate in Ground Water at the Green River, Utah, Disposal Site

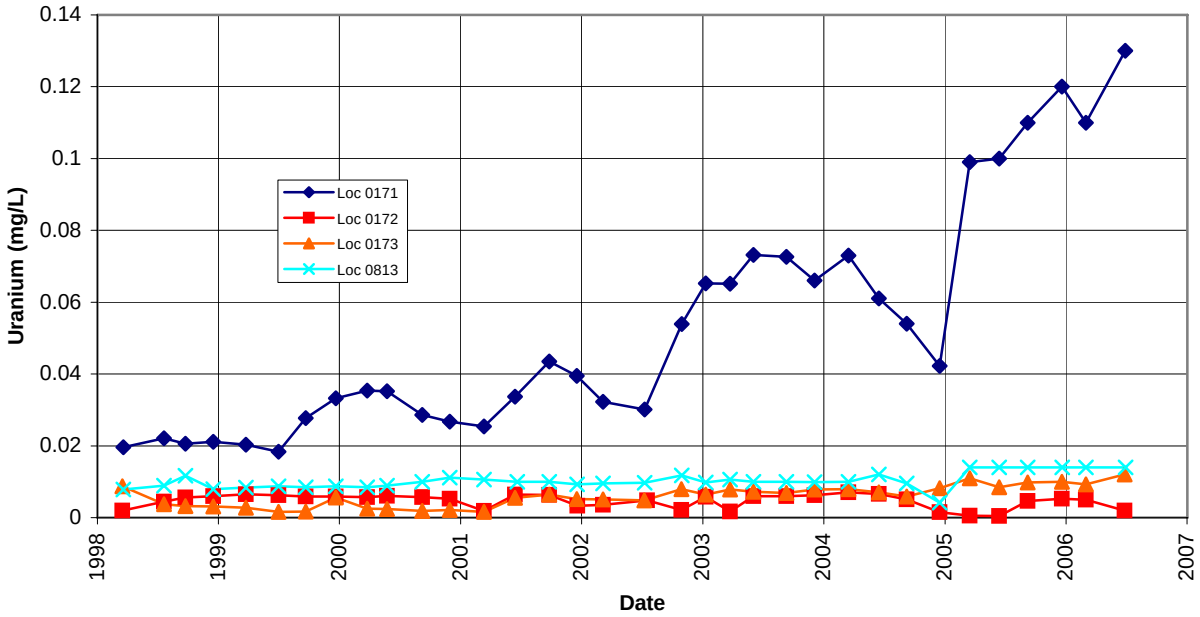


Figure 7−4.Time-Concentration Plots of Uranium in Ground Water at the Green River, Utah, Disposal Site

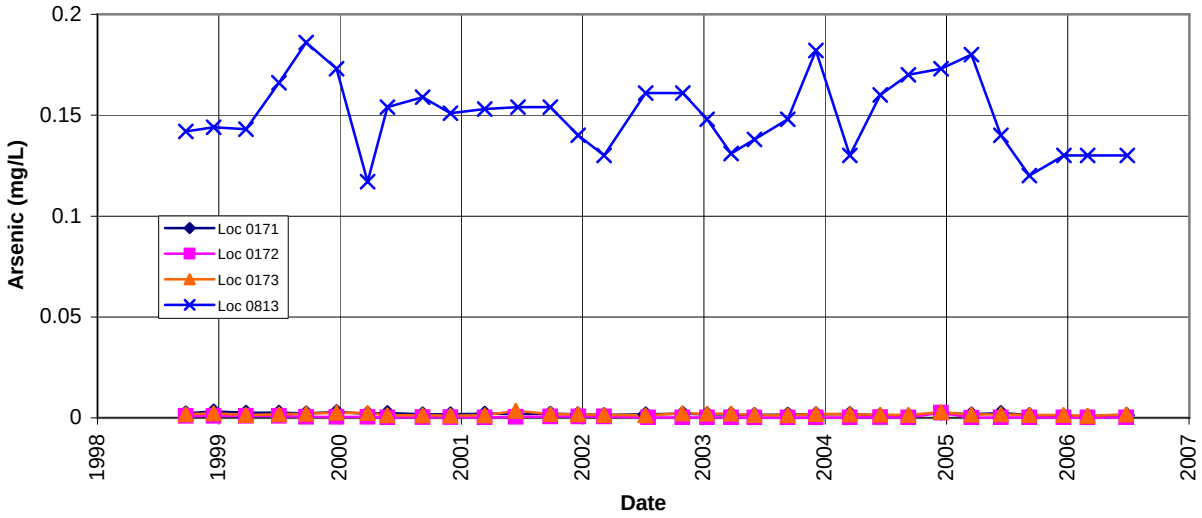


Figure 7−5.Time-Concentration Plots of Arsenic in Ground Water at the Green River, Utah, Disposal Site

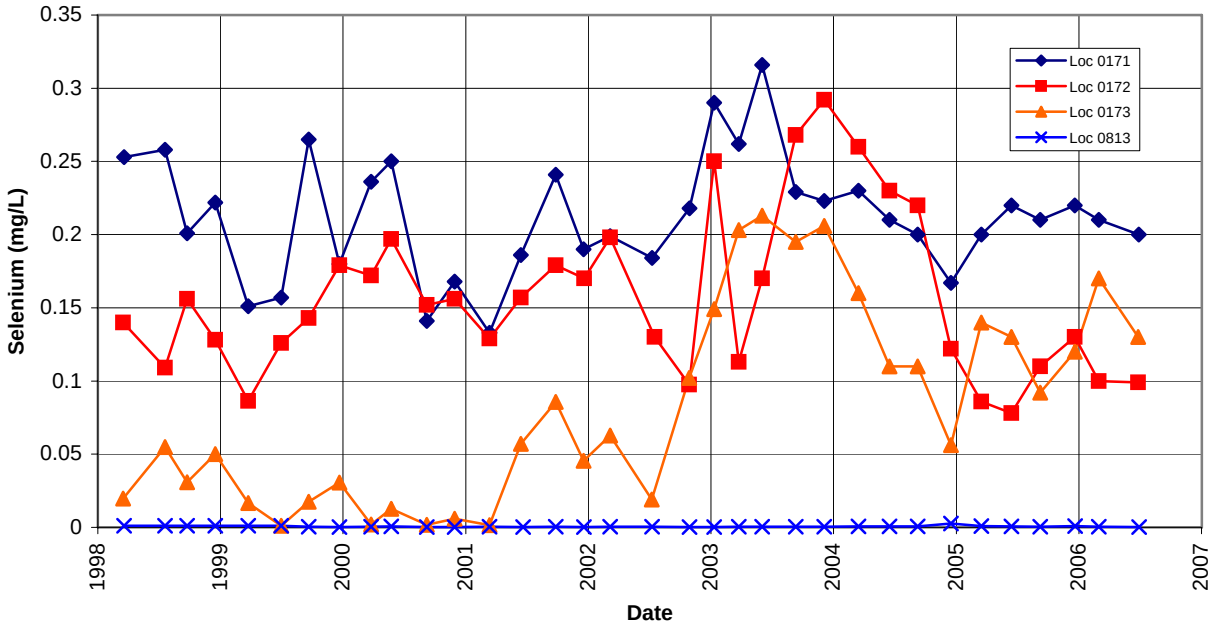


Figure 7−6.Time-Concentration Plots of Selenium in Ground Water at the Green River, Utah, Disposal Site

Sulfate concentrations in ground water are indicating similar trends as for nitrate (Figure 7–3). Sulfate concentrations have remained relatively constant in wells MW−0171 and MW−0813 since the disposal cell was constructed. Concentrations in wells MW−0172 and MW−0173 have fluctuated substantially since 1998, but there has been an overall downward trend for well MW–0172 since 1998 and a slight downward trend for well MW–0173 since the beginning of 2003.

Uranium concentrations in ground water remain below the MCL of 0.044 mg/L and considerably below the proposed ACL of 4.4 mg/L, and continue to remain essentially constant, in wells MW–0172, MW–0173, and MW–0813. At well MW−0171, however, concentrations exceed the MCL and continue to exhibit an overall upward trend (Figure 7–4). Because uranium is the only constituent of concern in well MW–0171 that has indicated an upward trend, no conclusions regarding the cause of the trend have been reached at this time.

Arsenic concentrations in ground water remain below the MCL of 0.05 mg/L and considerably below the proposed ACL of 5.0 mg/L in wells MW–0171, MW–0172, and MW–0173. In well MW−0813, levels have exceeded the MCL over the entire sampling period (Figure 7–5) but are substantially below the proposed ACL. Concentrations in MW–0813 have averaged approximately 0.15 mg/L since 1998 with no apparent trend.

Selenium concentrations in ground water continued above the MCL of 0.01 mg/L but considerably below the proposed ACL of 1.0 mg/L in wells MW–0171, MW–0172, and MW–0173; concentrations in well MW−0813 remain near the laboratory detection limit (Figure 7–6). Except for MW–0813, there has been considerable variation in selenium concentrations; however, no trends are apparent.

Ground Water Level Monitoring—Ground water levels in several monitor wells adjacent to the disposal cell have been measured manually since 1991, and continually with down-hole dataloggers since 1999. Erroneous manual measurements, likely due to equipment problems, occurred in 2000, 2001, 2004, and 2006 (Figure 7–7)—the continuous measurements indicated essentially no change at those times. Well hydrographs indicate that an overall decrease in the ground water elevation of approximately 2 feet occurred from 1998 through 2004, followed by an increase of approximately 4 feet since then. This increase in ground water elevations is likely a result of recharge caused from the increased regional precipitation that has occurred since late 2004.

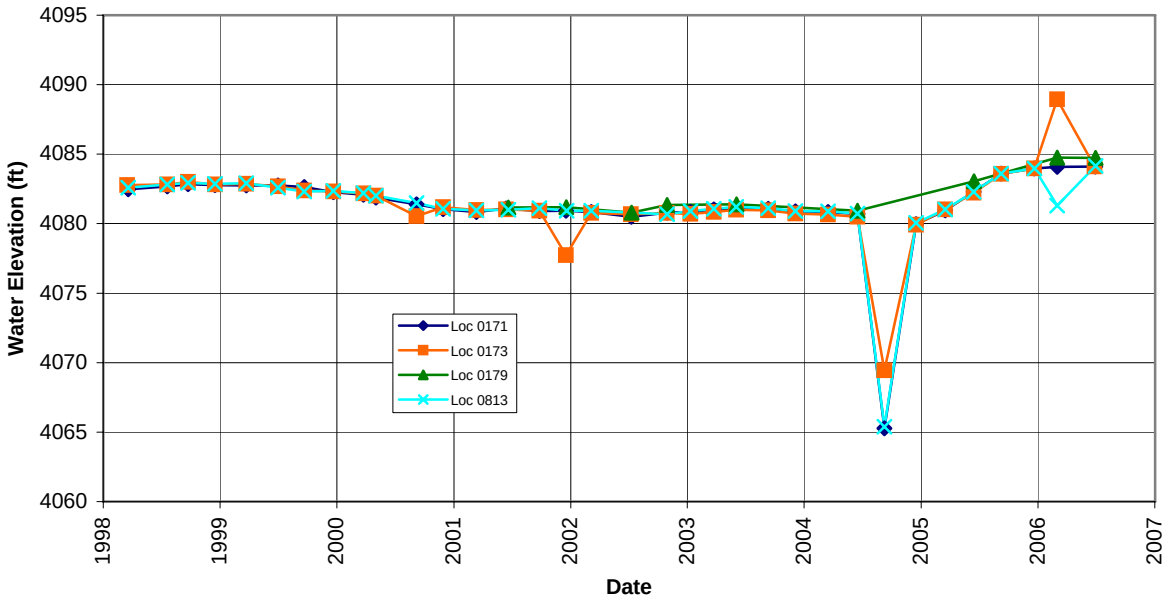


Figure 7−7. Ground Water Elevations at the Green River, Utah, Disposal Site

7.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

7.3.6 Photographs

Table 7–3. Photographs Taken at the Green River, Utah, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	80	The southeast side slope of the disposal cell.
PL–2	310	Abandoned water tower and mill buildings northwest of the disposal cell.
PL–3	280	Pools in scour holes below Cedar Mountain Formation outcrops in Browns Wash (view downstream toward the Green River).

GRN 3/2006. PL–1. The southeast side slope of the disposal cell.

GRN 3/2006. PL–2. Abandoned water tower and mill buildings northwest of the disposal cell.

GRN 3/2006. PL–3. Pools in scour holes below Cedar Mountain Formation outcrops in Browns Wash (view downstream toward the Green River).

End of current section.

8.0 Gunnison, Colorado, Disposal Site

8.1 Compliance Summary

The Gunnison Disposal Site, inspected on May 30 and 31, 2006, was in excellent condition. The disposal cell, its cover, and associated drainage features are performing as designed. Several missing or illegible perimeter signs and the entrance sign were replaced. All former erosion areas continue to be stable. The BLM agreed to terminate the right-of-way permit for the reseeded areas along the former reclaimed Chance Gulch haul road based on successful revegetation (determined to meet BLM Wildlife Mitigation Plan criteria for closure). No cause for a follow-up or contingency inspection was identified.

8.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Gunnison, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Gunnison, Colorado, Disposal Site* (DOE/AL/62350−222, Rev. 2, U.S. Department of Energy [DOE], Albuquerque Operations Office, April 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 8–1.

Table 8–1. License Requirements for the Gunnison, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.1	Section 8.3.1
Follow-up or Contingency Inspections	Section 3.5	Section 8.3.2
Routine Maintenance and Repairs	Section 5.0	Section 8.3.3
Ground Water Monitoring	Section 4.1	Section 8.3.4
Corrective Action	Section 6.0	Section 8.3.5

Institutional Controls—The 92-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1997. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

8.3 Compliance Review

8.3.1 Annual Inspection and Report

The site, located southeast of Gunnison, Colorado, was inspected on May 30 and 31, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 8–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

8.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Gate, Signs, and Fence— Access to the site is off Gunnison County Road 42 onto U.S. Bureau of Land Management (BLM) Road 3068 to the site entrance gate. The road to the site is an all-weather gravel road maintained by the BLM and is in good condition. The entrance gate is a simple barbed-wire gate in the stock fence that surrounds the site. The gate, secured by a padlock and chain to the adjoining post, is in good condition.

An entrance sign and 45 perimeter signs are attached to the posts of the perimeter fence. The
8A entrance sign, missing at the time of the inspection, was replaced. Perimeter signs P4 and P37 were also missing, and signs P38 and P44 were illegible due to extensive bullet damage; all were replaced. Several other perimeter signs have bullet damage but are still legible. The remaining signs are in excellent condition.

A 3-strand barbed-wire fence delineates the site perimeter. Two barbed-wire gates—one on the north fence line, the other on the east fence line—provide monitor well access. The top strand of wire was broken at perimeter sign P38 and was repaired; otherwise, the fence and gates are in excellent condition.

Site Markers, Survey Monuments, and Boundary Monuments—The two site markers, three combination survey/boundary monuments, and eight boundary monuments were in excellent condition (PL–1).

Monitor Wells— Sixteen wells comprise the ground water monitoring network at the disposal site. Six of the wells are for monitoring cell performance, two for monitoring background ground water quality, and eight for water level measurements. The wells were secure and in excellent condition (PL–2).

8.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the riprap-covered disposal cell; (2) the riprap-covered side slopes, apron, and diversion ditches; (3) the area between the disposal cell and the site boundary; and (4) the outlying area. Transect four included an inspection of several reseeded areas on reclaimed former haul roads.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Top of Disposal Cell—The top of the disposal cell was in excellent condition (PL–3). There was no evidence of erosion, settling, slumping, or rock degradation. Several isolated patches of grass were observed on the disposal cell cover; however, these shallow-rooted plants do not impact the performance of the cover. Many small indentations were present on the cell cover. The indentations, with dimensions up to 4 inches across and up to 4 inches deep, appear to have been caused by pronghorn antelope. None of the indentations penetrate into the bedding layer under the rock cover and are not a cause for concern.

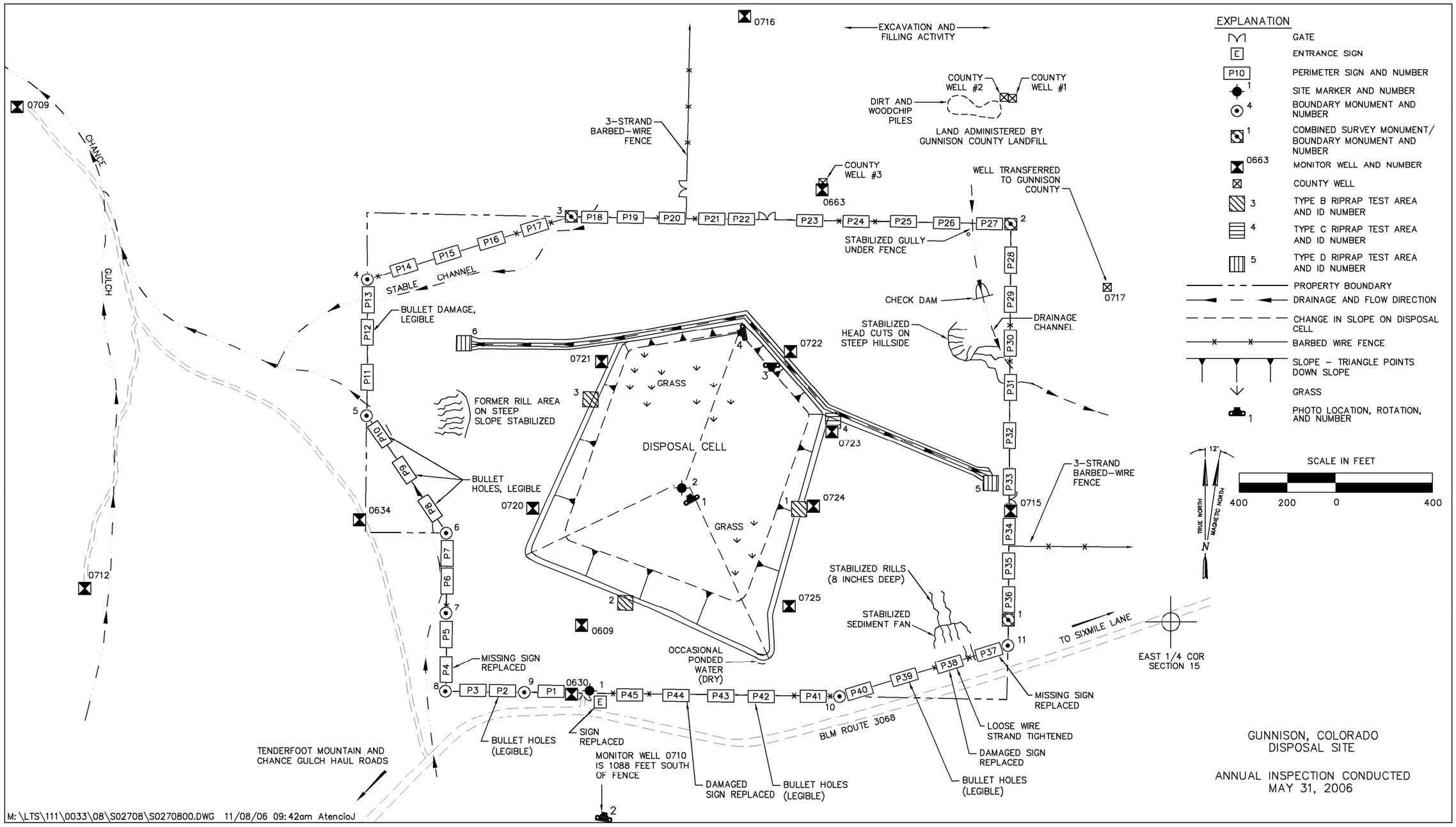


Figure 8–1. 2006 Annual Compliance Drawing for the Gunnison, Colorado, Disposal Site

Side Slopes, Apron, and Diversion Ditches—The riprap-covered side slopes, apron, and diversion ditches were in excellent condition (PL–4). No evidence of slumping, settling, or significant encroachment of vegetation was observed.

At the southeast corner of the cell apron, water draining from the cell occasionally ponds in a low-lying area along the edge of the riprap. The riparian-type vegetation that has become established indicates this area retains moisture much of the time. Water collection in this area does not pose a problem because the cell is designed to drain to the southeast, and any water that ponds is below the elevation of the tailings. This area was dry at the time of the inspection.

The condition of the riprap in six monitoring plots was visually inspected. Each monitoring plot, roughly 1 square meter in area, is in a "critical flow path" location in the apron and diversion channels. Corners of each monitoring plot are marked with orange paint. Overall, the rock is in excellent condition. As outlined in the LTSP, annual photographing and comparing of these monitoring plots occurred through the 2002 inspection, and the monitoring plots will be photographed every 5 years until 2017. The monitoring plots will be photographed again in 2007.

Area Between the Disposal Cell and the Site Boundary—Reclaimed and undisturbed areas occur between the disposal cell and the site perimeter. Areas disturbed during cell construction were regraded and then reclaimed by planting a seed mix. At the time of the 2006 inspection, both the seeded areas and the undisturbed areas were in excellent condition. Reclaimed areas had good coverage of vegetation, mostly grass. Shrub and forb abundance and diversity is much less in reclaimed areas than in undisturbed areas.

During the 2006 inspection, four areas of the site containing erosional features were investigated: rills in the southeast corner, north of perimeter sign P38; gullied areas in the northeast; a drainage channel in the northwest; and rills on a steep west-facing slope on the west side.

- In the southeast erosional area, several 8-inch-deep rills had formed in the steeper portion of the slope, and a fan-like accumulation of eroded sediments had formed just below the rills. The area was found to be in stable condition. Vegetation is well established on the steeper portions of the eroded slopes. No recent erosion was evident.

- In the northeast portion of the property, a series of deep gullies and headcuts had formed at a natural slope break in the terrain. No new erosion was noted, and the gullies continue to stabilize with the successful establishment of sagebrush and various grasses. No evidence of new erosion or sediment transport off site was observed at the drainage channel between perimeter signs P30 and P31.

- In the northwest portion of the property, a drainage channel tributary to Chance Gulch was inspected. This area continues to be stable and in good condition.

- On the west side of the property, rills had been noted on the steep west-facing slope during previous inspections. Surface rock fragments and vegetation have stabilized the slope.

Although these areas currently are stable and none of them encroach on the cell or diversion ditches, the steep topography makes them susceptible to erosion. Monitoring will continue for signs of increased erosion or any other indications of slope instability.

Vandalism at the site continues. Several perimeter signs were removed or severely damaged and were replaced.

Outlying Area—Gunnison County owns the land that adjoins the disposal site boundary to the north and east, and uses the land for a municipal landfill. In 2001, the county installed several fences and monitor wells in these areas. The monitor wells are identified as County Wells 1, 2, and 3 on Figure 8–1. DOE transferred former monitor well MW−0717 to the county in 2001. The county installed unlocked wire gates to allow DOE access to their monitor wells.

Landfill operations have encroached to within approximately 400 feet of the northeast corner of the DOE property boundary. A check dam was constructed on landfill property west of the disposal site, apparently to control sediment transport. Although landfill activities do not appear to pose a threat to the disposal site, DOE will continue to monitor the level of activity occurring near the site property boundaries and site surveillance features (e.g., fences and monitor wells).

This transect also includes inspection of several reseeded areas on the reclaimed former Chance Gulch haul road, which are approximately 2 miles west of the disposal cell.

This road was established during cell construction to access a borrow area. The restored area is within critical habitat of the Gunnison sage grouse. A BLM right-of-way permit and a Wildlife Mitigation Plan establish criteria for successful revegetation for this road. The BLM Wildlife Mitigation Plan requires the establishment of forbs (e.g., alfalfa, buckwheat, vetch, and wild flowers) to improve habitat for sage grouse and pronghorn antelope. DOE has been working to revegetate the road through a period of extended drought to meet BLM restoration criteria and close permits.

Although restoration has been successful along most of the reclaimed road, several isolated areas were reseeded in October 2000 to meet BLM's vegetation success criteria for species diversity. Additional areas were reseeded and mulched in fall 2004 to promote species diversity.

On May 30, 2006, the inspectors met with BLM staff to inspect the restored areas. Overall, the revegetated areas contained an acceptable percentage of desirable, seeded species. Some of the areas, however, also contained small infestations of cheatgrass, a noxious weed that BLM is trying to eradicate in this area. Consequently, at BLM's request, local personnel were subcontracted to remove cheatgrass plants (June) and apply herbicide (September) to newly germinating cheatgrass plants. Following these actions, BLM re-inspected the area and agreed to terminate DOE's right-of-way permit (fall 2006).

8B

8.3.2 Follow-up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

8.3.3 Routine Maintenance and Repairs

In 2006, DOE replaced the entrance sign and several perimeter signs.

8.3.4 Ground Water Monitoring

DOE monitors ground water at the Gunnison disposal site to demonstrate compliance with U.S. Environmental Protection Agency ground water protection standards in 40 CFR 192.03 and to
8C demonstrate that the disposal cell is performing as designed. The monitoring network consists of 16 wells, including six point-of-compliance wells to determine cell performance, two background wells, and eight wells for water level measurements (Table 8−2). Ground water was sampled and water levels were measured annually from 1998 through 2001. After the 2001 sampling event, the sampling frequency changed to a five-year basis, and sampling and water-level measurements were collected in 2006.

The indicator analyte for cell performance at the Gunnison site is uranium. This analyte was selected on the basis of its presence in tailings pore fluid, its relatively high mobility in ground water, and its low concentration in upgradient (background) ground water. The target concentration of uranium is 0.013 mg/L. The basis for this value is the maximum observed concentration of uranium in background samples determined prior to long-term surveillance and maintenance. The maximum concentration level, or MCL, established for uranium by EPA is higher at 0.044 mg/L.

Table 8–2. Active Monitor Wells at the Gunnison, Colorado, Disposal Site

Compliance and Background Wells	Water Level Wells
MW−0720 (compliance)	MW−0630
MW−0721 (compliance)	MW−0634
MW−0722 (compliance)	MW−0663
MW−0723 (compliance)	MW−0709
MW−0724 (compliance)	MW−0710
MW−0725 (compliance)	MW−0712
MW−0609 (background)	MW−0714
MW−0716 (background)	MW−0715

Ground Water Quality Monitoring—Ground water at the Gunnison disposal site was sampled in May 2006. The concentration of uranium in samples collected at background wells MW-0609 and MW-0716 was 0.0012 mg/L and 0.0017 mg/L, respectively. The concentration of uranium in samples collected from point-of-compliance wells ranged between 0.00073 mg/L and 0.005 mg/L, which is consistent with historical results as shown in the time versus concentration graphs (Figure 8−2). Uranium results from the point of compliance wells were one to two orders of magnitude below the action level of 0.013 mg/L.

Samples also were analyzed for major anions (chloride and sulfate) and cations (calcium, magnesium, potassium, and sodium), metals (iron and manganese), and total dissolved solids as indicators of general water quality. These results were consistent with historical results

indicating no significant change in general water chemistry. The consistent general water-quality, along with the low uranium concentrations, indicate the disposal cell continues to perform as an efficient containment system.

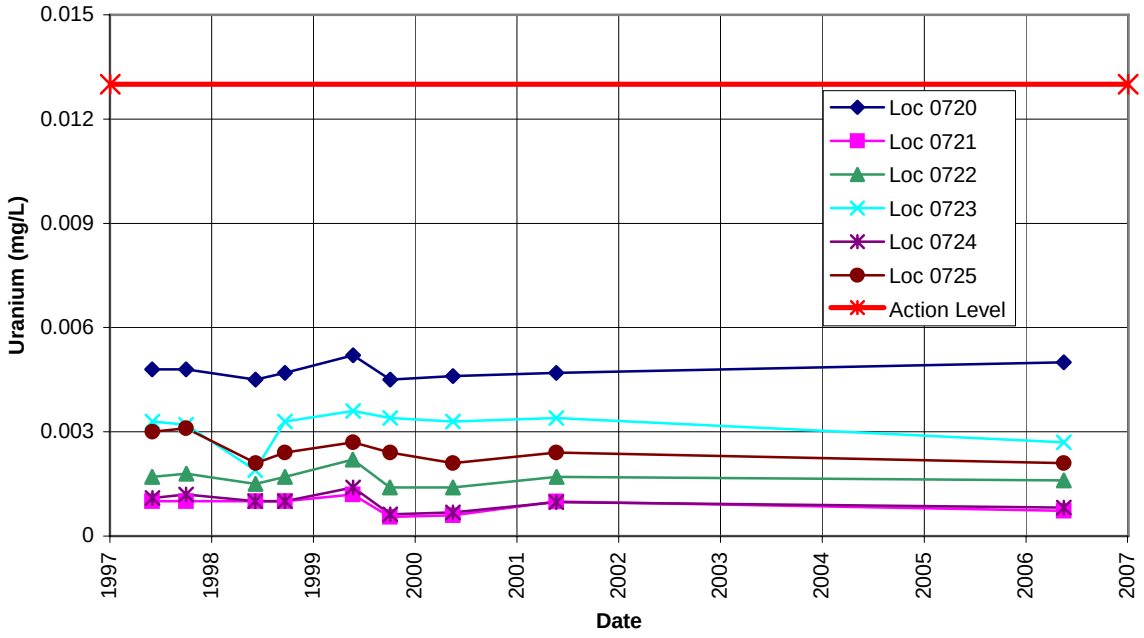


Figure 8–2. Time-Concentration Plots of Uranium in Ground Water at the Gunnison, Colorado, Disposal Site

Ground Water Level Monitoring—Water levels from the entire monitoring network were measured in June 2006. Data from water-level measurements show only minor fluctuations in ground water elevations since completion of the disposal cell in 1995; hydrographs from selected wells across the site illustrate this consistency in water levels (Figure 8−3). Water level measurements indicate essentially steady-state ground water conditions at the site.

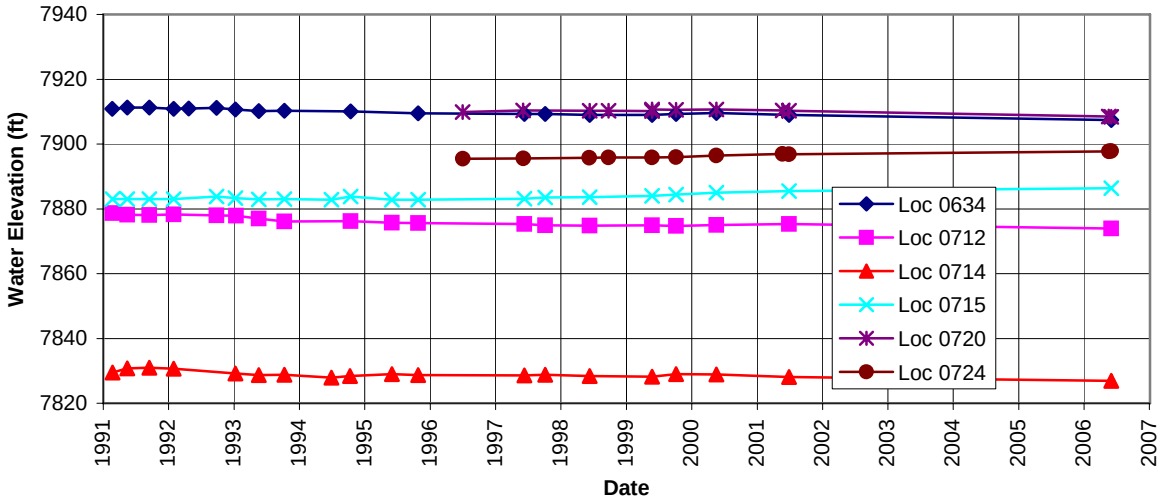


Figure 8−3. Water Level Measurements at Active Monitor Wells at the Gunnison, Colorado, Disposal Site

8.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

Photographs

Table 8–3. Photographs Taken at the Gunnison, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description of Photograph
PL–1	330	Site marker SMK-2.
PL–2	10	Disposal cell viewed from monitor well MW-0710.
PL–3	180	View south across of the disposal cell top.
PL–4	260	View west of the north side slope, apron, and diversion ditch.

GUN 5/2006. PL–1. Site marker SMK-2.

GUN 5/2006. PL–2. Disposal cell viewed from monitor well MW-0710.

GUN 5/2006. PL–3. View south across of the disposal cell top.

GUN 5/2006. PL–4. View west of the north side slope, apron, and diversion ditch.

End of current section.

9.0 Lakeview, Oregon, Disposal Site

9.1 Compliance Summary

The Lakeview Disposal Site, inspected on July 19, 2006, was in good condition. The revised Long-Term Surveillance Plan (LTSP), submitted in 2002, continues to remain pending U.S. Nuclear Regulatory Commission (NRC) approval. The revised LTSP includes a recalculated side slope riprap median diameter (D_{50}); the minimum size required to protect the cell from erosion caused by storm runoff from a probable maximum precipitation event. Rock gradation monitoring of west side slope riprap indicated that the median diameter of the riprap (2.26 inches) remains above the recalculated minimum size (1.8 inches). Vegetation cover on the cell top has gradually increased over the years as patches of deeper-rooted grasses have spread; however, the vegetative cover was not as complete as in 2005 because of a dryer spring. Evaluation of the effects of deep-rooted vegetation on the performance of the disposal cell cover by modeling the movement of water through the radon barrier using water flux meters continues. No requirement for a follow-up inspection was identified.

9.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Lakeview, Oregon, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan for the Collins Ranch Disposal Site, Lakeview, Oregon* (DOE/AL/62350–19F, Rev. 3, U.S. Department of Energy [DOE], Albuquerque Operations Office, August 1994) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 9–1. A revised LTSP for the site, prepared in August 2002, is pending NRC concurrence.

Table 9–1. License Requirements for the Lakeview, Oregon, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.1	Section 9.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 9.3.2
Routine Maintenance and Repairs	Section 8.0	Section 9.3.3
Ground Water Monitoring	Section 5.3	Section 9.3.4
Corrective Action	Section 9.0	Section 9.3.5

Institutional Controls—The 40-acre disposal site is owned by the United States of America and was accepted under the NRC general license (10 CFR 40.27) in 1995. It was acquired from the privately held Collins Ranch by the State of Oregon through a civil action suit (Lake County Circuit Case No. L-86-060-CV, File No. 330-050-TL001-86) and transferred to the DOE for long-term care and ownership. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

9.3 Compliance Review

9.3.1 Annual Inspection and Report

The site, northwest of Lakeview, Oregon, was inspected on July 19, 2006. Results of the inspection are described below. Features and the photograph locations (PLs) mentioned in this report are shown on Figure 9–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

9.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Gate, Fence, and Signs—Access to the site is gained by traveling a gravel road that heads west off County Road 2–16B. The 1.2-mile access road between the county road and the DOE property boundary has a perpetual easement across private property (Collins Ranch). A DOE lock is on a cable gate across the access road at a cattle guard approximately 0.4 mile east of the site.

A barbed-wire boundary fence surrounds the site, and overall, was in good condition at the time of the inspection. Damaged or loose strands of fence occur along the northeast boundary fence. A lower strand of barbed wire along the western boundary is damaged or missing in places, allowing animals to have entered the site in the past.

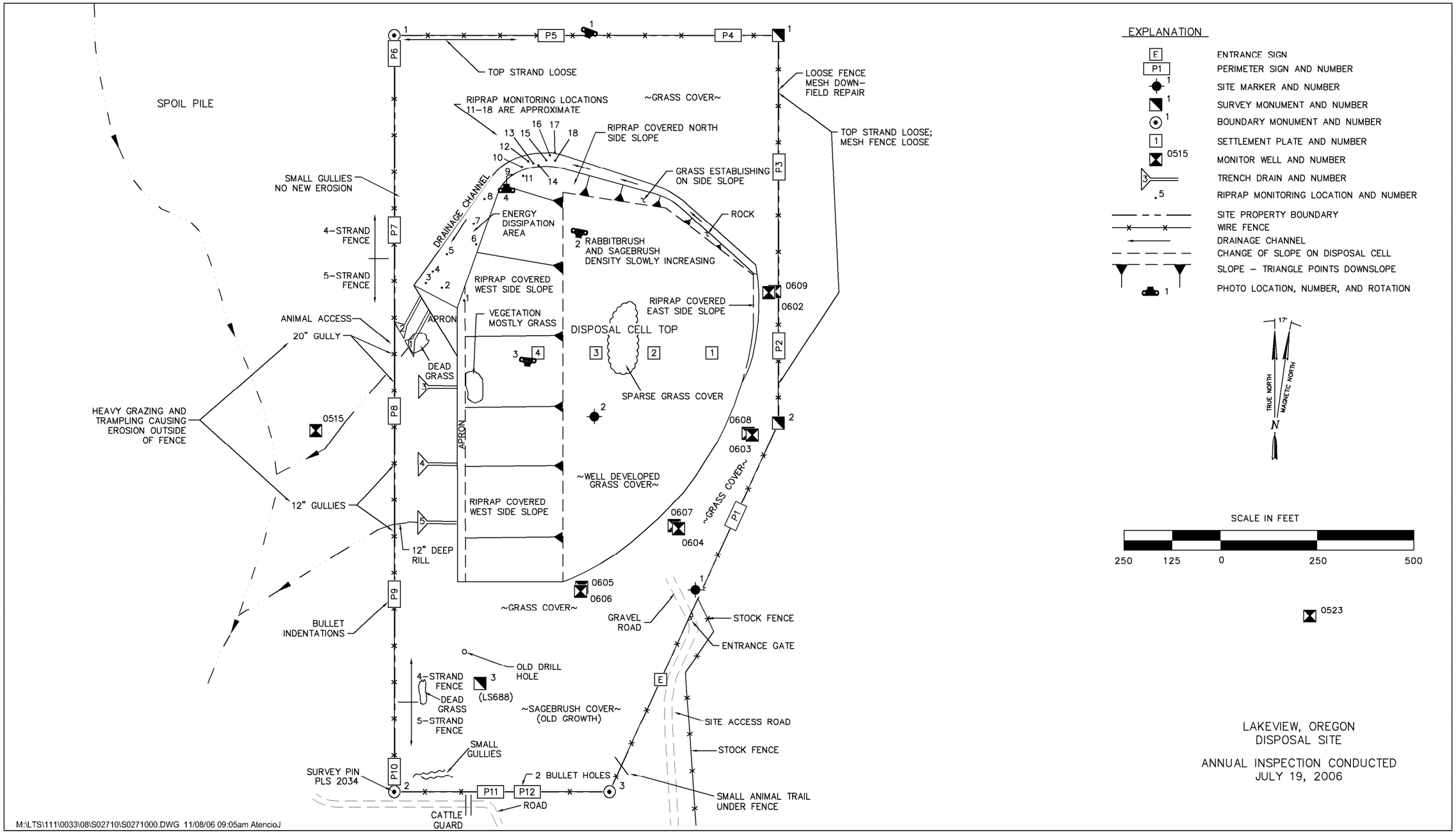
The entrance sign was in good condition. Ten of the twelve perimeter signs were in excellent condition. Perimeter signs P9 and P12 have bullet damage but were legible.

Site Markers and Monuments—The two site markers, three survey monuments, and three boundary monuments were in excellent condition.

Monitor Wells—Nine monitor wells are in the ground water monitoring network. All of the wells inspected were found to be locked and in good condition.

Seismic Activity—The Lakeview Disposal Site is located in a seismically active region of the United States. The United States Geological Survey National Earthquake Information Center (USGS/NEIC) notifies DOE when earthquakes of magnitude 3.0 or greater occur within 20 miles (0.3 degree) of a disposal cell and when earthquakes of magnitude 5.0 or greater occur within 70 miles (1.0 degree) of a disposal cell.

Two such events occurred in 2005: a 3.4 magnitude quake occurred 15 miles east-northeast of the site on June 11 and 3.6 magnitude quake occurred 15 miles east of the site on August 12. No structural effects were noted at the site during the 2005 annual inspection (July), the follow-up inspection (September 2005), or the 2006 inspection. No seismic activity was reported in 2006.



EXPLANATION

- E — ENTRANCE SIGN
- P1 — PERIMETER SIGN AND NUMBER
- 1 — SITE MARKER AND NUMBER
- 1 — SURVEY MONUMENT AND NUMBER
- 1 — BOUNDARY MONUMENT AND NUMBER
- 1 — SETTLEMENT PLATE AND NUMBER
- 0515 — MONITOR WELL AND NUMBER
- 3 — TRENCH DRAIN AND NUMBER
- .5 — RIPRAP MONITORING LOCATION AND NUMBER
- SITE PROPERTY BOUNDARY
- WIRE FENCE
- DRAINAGE CHANNEL
- CHANGE OF SLOPE ON DISPOSAL CELL
- SLOPE – TRIANGLE POINTS DOWNSLOPE
- 1 — PHOTO LOCATION, NUMBER, AND ROTATION

SCALE IN FEET

250 125 0 250 500

0523

LAKEVIEW, OREGON
DISPOSAL SITE

ANNUAL INSPECTION CONDUCTED
JULY 19, 2006

Figure 9–1. 2006 Annual Compliance Drawing for the Lakeview, Oregon, Disposal Site

9.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the top of disposal cell; (2) the side slopes of the disposal cell and adjacent drainage channel, aprons, and trench drains; and (3) the site perimeter and outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Top of the Disposal Cell—The design for the top of the disposal cell has produced conditions that favor the growth of deep-rooted plants. The thin soil layer overlying a layer of rock on the top slope stores very little water, hence, most precipitation percolates deeper where it either drains laterally in the coarse sand layer or infiltrates the compacted soil layer (radon barrier).

The top slope was seeded with grasses, but the low water-storage capacity of the thin (nominal 4-inch-thick) topsoil layer has limited grass growth to scattered patches of deeper-rooted wheat grasses. The total vegetative cell cover has gradually increased over the years as patches of deeper-rooted grasses have spread; however, the vegetative cover was not as complete in 2006 as in 2005 because of a dryer spring (PL–1). Perennials and annuals, although limited, are also establishing on the cell top. Some areas still were found to have sparse vegetation.

Movement of precipitation through the riprap and bedding layers and into the radon barrier also favors the growth of shrubs. Sagebrush, rabbitbrush, and bitterbrush, which are the dominant plant communities surrounding the site, have been establishing on the top of the disposal cell. During the 2006 inspection it was noted that the shrub density continues to increase. Shrub growth likely will continue to increase until it approaches or exceeds levels observed in native plant communities adjacent to the site.

9A **Disposal Cell Cover Performance Evaluation**— Field investigations at the site indicate that a combination of soil development and root intrusion by the deep-rooted shrubs has increased the hydraulic conductivity of the radon barrier in the cell cover, which may allow meteoric water to percolate into the underlying tailings.

Encroachment by deep-rooted shrubs was observed shortly after construction of the disposal cell. As designed and constructed, the cover is a favorable habitat for deep-rooted plants. Rock armor on the side slopes and the thin soil layer overlying rock on the top slope store very little water, hence, most precipitation percolates deeper where it either drains laterally in the coarse sand layer or infiltrates the compacted soil layer (radon barrier). These conditions favor establishment and survival of sagebrush, rabbitbrush, and bitterbrush, which dominate plant communities surrounding the site. Root intrusion and soil development have increased the permeability of the radon barrier. In situ tests have shown that the saturated hydraulic conductivity of the radon barrier ranges between 1×10^{-6} and 1×10^{-4} cm/s (the design target was 1×10^{-7} to 1×10^{-8} cm/s). DOE, in collaboration with Sandia National Laboratory and Pacific Northwest National Laboratory, is demonstrating a performance evaluation model of the effects of root intrusion on the hydrology of the cell cover, and on the likelihood and risks of contaminant leaching.

Because saturation of the radon barrier varies between saturated and unsaturated, and because of uncertainties involved in modeling unsaturated flow, DOE installed instrumentation to directly measure percolation rates through the cell cover and into the tailings. Water fluxmeters, capable of directly monitoring unsaturated water fluxes ranging from less than 10 millimeters per year to more than 1,000 millimeters per year, were installed within or directly below the cell cover in September and October of 2005. Fluxmeters were placed near the lower edge of the top slope where water is most likely to collect as a result of runoff and lateral flow in the drainage layer (PL–2). A weather station and remote data transfer instrumentation were also installed.

Studies of natural systems in the area (natural analog studies) have provided evidence for scenarios of the long-term performance of the cover. Some inferences that have emerged from these natural analog studies follow:

- Plant succession and soil development on the cover may lead to even greater permeability of the radon barrier.
- Soil development and plant succession on the cover may also lead to an increase in evapotranspiration, keeping the radon barrier unsaturated and, hence, effectively offsetting the increase in permeability.
- As rock riprap on the cover degrades, vegetation growing in the rocky soil that will likely develop on side slopes may be adequate for long-term erosion control.

Results from the continued water flux monitoring on the cell cover show that water has flowed through the cover into the tailings between November 2005 and May 2006. These measurements will continue for three to five years.

Side Slopes of the Disposal Cell and Adjacent Drainage Channel, Aprons, and Trench Drains—The general appearance of the riprap-covered features is good (PL–1). The side slope cover shows no sign of slumping or movement.

Encroachment of grass has increased in the riprap on the north side slope, in the upper (eastern) part of the drainage channel, in the energy dissipation area at the lower end of the drainage channel, and the western apron area. Areas of dead grasses and mossy vegetation observed along the western toe suggest wetter periods of growth in recent times compared to the current drier conditions. Plant growth in the drainage channel is not significant and does not degrade the function of the channel.

Standing water observed during past inspections was absent from the large depression in the energy dissipation area at the lower end of the drainage channel. Water is a concern because inundation may accelerate deterioration of the large riprap due to freeze-thaw processes and secondary mineralization or alteration.

Riprap Degradation Evaluation—Riprap for the disposal cell was sized to withstand the erosive energy of a probable maximum precipitation event—a conservative, worst-case scenario in which the most severe meteorological conditions possible combine and occur at the same time. Deterioration of riprap on the west and north side slopes and in the energy dissipation area at the lower end of the drainage channel is an ongoing concern because the percentage of crumbling rocks on the surface had noticeably increased since the riprap was placed in 1989.

The original design specified a side slope riprap median rock diameter (D_{50}) of 2.7 inches. Subsequent observations indicated that the riprap could degrade to a value less than the designed D_{50}. To determine if the riprap degradation posed a risk for cell erosion, DOE recalculated the

9B minimum D_{50} using the U.S. Army Corps of Engineers Hydrologic Modeling System computer model currently accepted by NRC. The recalculated minimum D_{50} necessary to protect the disposal cell is 1.8 inches. DOE submitted a revised LTSP in 2002 addressing the recalculated minimum D_{50}; the plan remains pending NRC approval.

9C Annual rock gradation monitoring of side slope riprap was performed for the tenth year during the 2006 inspection (PL–3). Particle size distribution (weight percent) by count data was collected at 20 locations. The 2006 results indicate an average D_{50} of 2.26 inches with a 95 percent confidence interval between 2.04 and 2.48 inches (Figure 9–2). The mean D_{50} in 2005 was 2.41 inches. The D_{50} value measured for 2006 is similar to values measured for most of the previous 5 years: 2001 (D_{50} = 2.56), 2002 (D_{50} = 2.35), 2003 (D_{50} = 2.74), 2004 (D_{50} = 2.48), and 2005 (D_{50} = 2.41). The average D_{50} for the previous five years is 2.51.

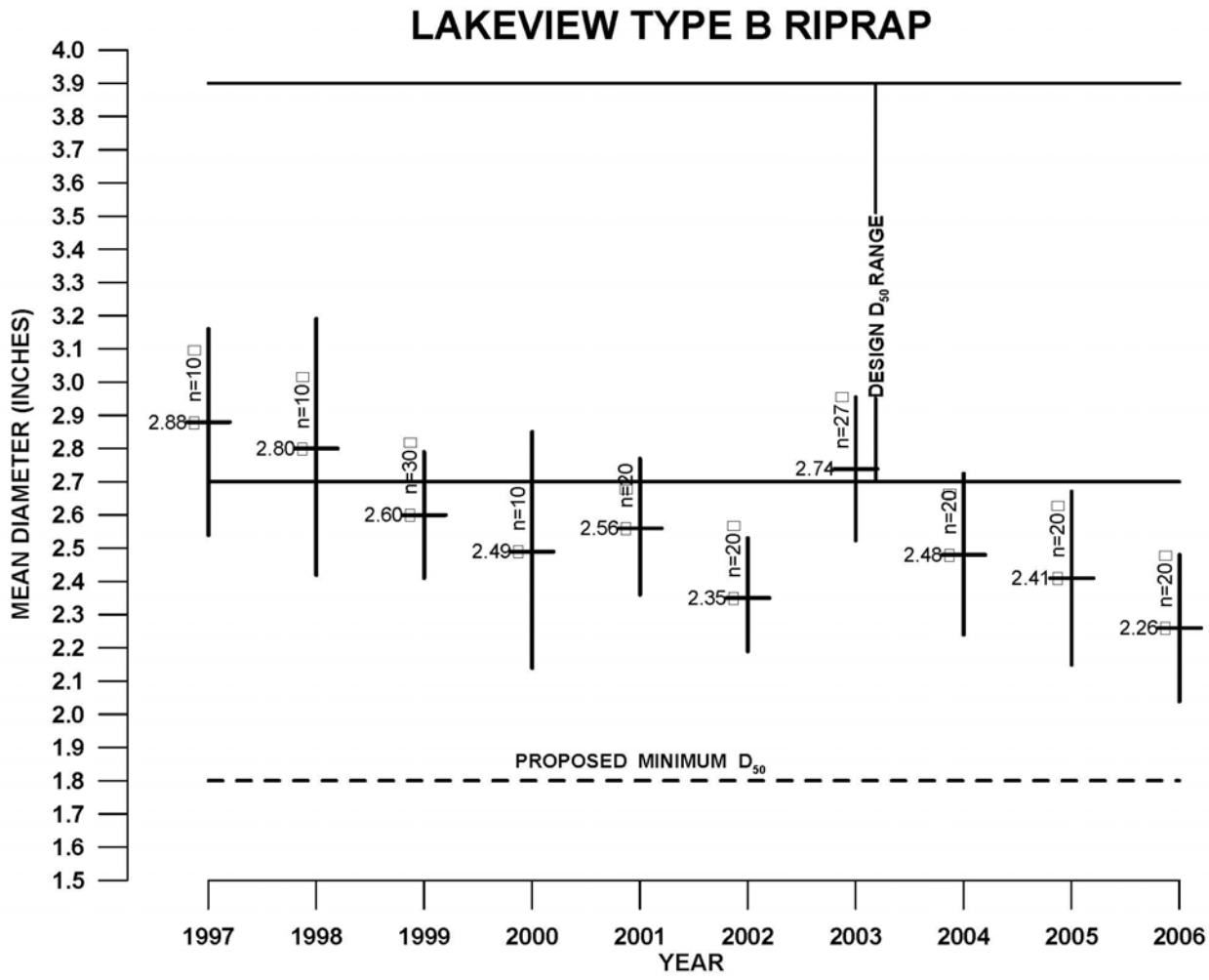


Figure 9–2. Side Slope Riprap Gradation Monitoring Results for the Lakeview, Oregon, Disposal Site

Detailed measurements of this erosional process began in 1997. Since that time the mean diameter has decreased about 20 percent. The overall trend of D_{50} rock sizes from 1997 to the present suggests a gradual decrease in size. However, initially (1997 – 1999) the trend appeared to be more rapid than in more recent years. This initial more rapid decreasing trend may be because the basaltic rocks used on the side slope were predisposed to chemical or physical weathering and reacted more quickly to newly imposed surface conditions during the first decade (1989-1999) after cell completion. Therefore, the first decade of rock weathering may have seen the greatest and most rapid loss of rock integrity. The overall decrease in size may represent a minimum decrease in rock size because rock diameters are measured from surface samples and smaller fragments, derived from crumpling rocks, may have fallen into the interstices, thus producing a bias sample. Nevertheless, the current method of rock-size measurement has been performed for the past 10 years and does provide a consistent metric for cover material changes.

DOE will continue annual rock gradation monitoring of riprap to ensure that the side slopes of the disposal cell are protected from erosion. If it becomes apparent that the side slope riprap is continuing to deteriorate and that the measured D_{50} will eventually fall below 1.8 inches, DOE, in consultation with NRC, will evaluate alternatives and take corrective action, as necessary.

In addition to the side slope riprap monitoring discussed above, DOE also performs long-term monitoring of riprap at a second location (the energy dissipation area) through the use of annual comparative photographs. Eighteen points in the energy dissipation area were re-photographed (PL–4). Minimal rock degradation has been observed since monitoring began at the original ten locations established in 1997 or at the eight additional locations established in 2000.

Site Perimeter and Outlying Area— This transect includes the area extending from the disposal cell to the site boundary and the area within 0.25 mile surrounding the site.

Gullies that formed in seeded areas extending west of Trench Drains 1, 2, 3, 4, and 5 were filled with rock in 2000. The rock has arrested the headcutting that was proceeding from the Collins Ranch property onto the DOE property. Small gullies observed forming downslope of the rock were not large enough to warrant repair. Additional small gullies were observed in the southwest corner of the site just inside the perimeter fence and downhill of an inclined road that intersects the fence line. These small gullies are likely the result of runoff from the road during rain events and present no immediate cause for concern.

Reseeded areas between the disposal cell and site boundary were well established, and the native grass and shrub communities outside the site boundary were in good condition except some areas on the west where heavy grazing occurs.

The area within 0.25 mile of the site boundary was unchanged from 2005.

9.3.2 Follow-up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

9.3.3 Routine Maintenance and Repairs

In 2006, DOE replaced the lock on access road cable gate and performed minor fence repairs.

9.3.4 Ground Water Monitoring

DOE monitors ground water quality in the uppermost aquifer at this site once every 5 years, with the most recent sampling event performed in 2004. No monitoring was performed in 2006. Constituents analyzed every 5 years include arsenic, cadmium, and uranium. Their respective maximum concentration limits (MCLs), established by the U.S. Environmental Protection Agency in Table 1 to Subpart A of 40 CFR 192, are; 0.05 milligrams per liter (mg/L), 0.01 mg/L, and 0.044 mg/L. Concentrations of these constituents were well below their respective limits in 2004 (the last monitoring results) and were consistent with sampling results from 1999. Based on the monitoring results to date, there is no indication of any degradation of ground water in the vicinity of the site. The next ground water quality compliance monitoring is scheduled for 2009.

9.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

9.3.6 Photographs

Table 9–2. Photographs Taken at the Lakeview, Oregon, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	200	Disposal cell (background – upper left) showing vegetative cover on the cell top.
PL–2	190	Fluxmeters and weather station on the disposal cell top.
PL–3	185	Measuring riprap size on the side slope of the disposal cell.
PL–4	NA	Riprap monitoring location 9 at the energy dissipation area.

LKV 7/2006. PL–1. Disposal cell (background – upper left) showing vegetative cover on the cell top.

LKV 7/2006. PL–2. Fluxmeters and weather station on the disposal cell top.

LKV 7/2006. PL–3. Measuring riprap size on the side slope of the disposal cell.

LKV 7/2006. PL–4. Riprap monitoring location 9 at the energy dissipation area.

End of current section.

10.0 Lowman, Idaho, Disposal Site

10.1 Compliance Summary

The Lowman, Idaho, Disposal Site, inspected on July 11, 2006, was in excellent condition. Inspectors removed numerous young ponderosa pine trees that were obscuring views of perimeter signs, survey/boundary monuments, and site marker SMK–1. The seven monitor wells at the site were decommissioned in August 2006. Noxious weed infestations continue to be monitored and sprayed with herbicide; populations of the weeds have been reduced significantly. Inspectors found no cause for a follow-up or contingency inspection.

10.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Lowman, Idaho, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the U.S. Department of Energy Lowman, Idaho, (UMTRCA Title I) Disposal Site* (DOE–LM/GJ771–2005, Revision 2, U.S. Department of Energy [DOE], January 2005) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 10−1.

Table 10−1. License Requirements for the Lowman, Idaho, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.3	Section 10.3.1
Follow-up or Contingency Inspections	Section 3.4	Section 10.3.2
Routine Maintenance and Repairs	Section 3.5	Section 10.3.3
Ground Water Monitoring	Section 3.7	Section 10.3.4
Corrective Action	Section 3.6	Section 10.3.5

Institutional Controls—The 18-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license (10 CFR 40.27) in 1994. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, warning/no trespassing signs placed along the property boundary, and a locked gate across the access road that leads to the site; the site is not fenced. Verification of these institutional controls is part of the annual inspection.

10.3 Compliance Review

10.3.1 Annual Inspection and Report

The site, located northeast of Lowman, Idaho, was inspected on July 11, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 10−1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

10.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Gate, and Signs—The site is at the end of a hard-packed gravel road about 650-foot north of Idaho State Highway 21. The road was in excellent condition. A locked gate spans the road about 150 feet from the state highway and was in excellent condition.

One entrance sign and 18 perimeter signs delineate the unfenced site boundary. The entrance sign is just inside the site boundary near monitor well MW−0580. Although the sign had two bullet holes, it was still legible and does not need replacing. The 18 perimeter signs are on posts along the site boundary. Four signs have bullet holes or dents, but were legible and do not need to be replaced. The other perimeter signs were in excellent condition.

10A During the 2005 inspection, it was noted that young ponderosa pine trees were beginning to obscure the view of several signs. In 2006, inspectors removed the young trees adjacent to the entrance sign and perimeter signs P1, P4, P5, P6, and P18 (PL–1 and PL–2).

Site Markers and Monuments—There are two site markers, four boundary monuments, and
10B three combination survey/boundary monuments. All were in excellent condition. Maturing ponderosa pine trees were beginning to obstruct the view of SMK–1, so inspectors removed these trees during the 2006 inspection.

Monitor Wells—The monitoring network at the site consisted of six monitor wells: MW–0548, MW–0549, MW–0575, MW–0580, MW–0583, and MW–0641. Four of the wells were on DOE property and two were just outside the site boundary. A seventh well on the site, identified as LOW−01−029, was not part of the monitoring network.

10C Ground water monitoring is no longer required at the site according to the revised LTSP (January 2005). All seven wells were decommissioned in August 2006 in accordance with State of Idaho ground water protection requirements (PL–3 and PL–4).

10.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the top and side slope of the disposal cell; (2) the area between the disposal cell and the site boundary; and (3) the outlying area.

Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Top and Side Slope of the Disposal Cell—The disposal cell was completed in 1991. Basalt riprap armors the top and west-facing side slope of the disposal cell. An apron of larger riprap surrounds the disposal cell on all sides. The riprap was in excellent condition, and there was no evidence of instability, such as subsidence, slumping, or cracking was observed on any of the cell surfaces.

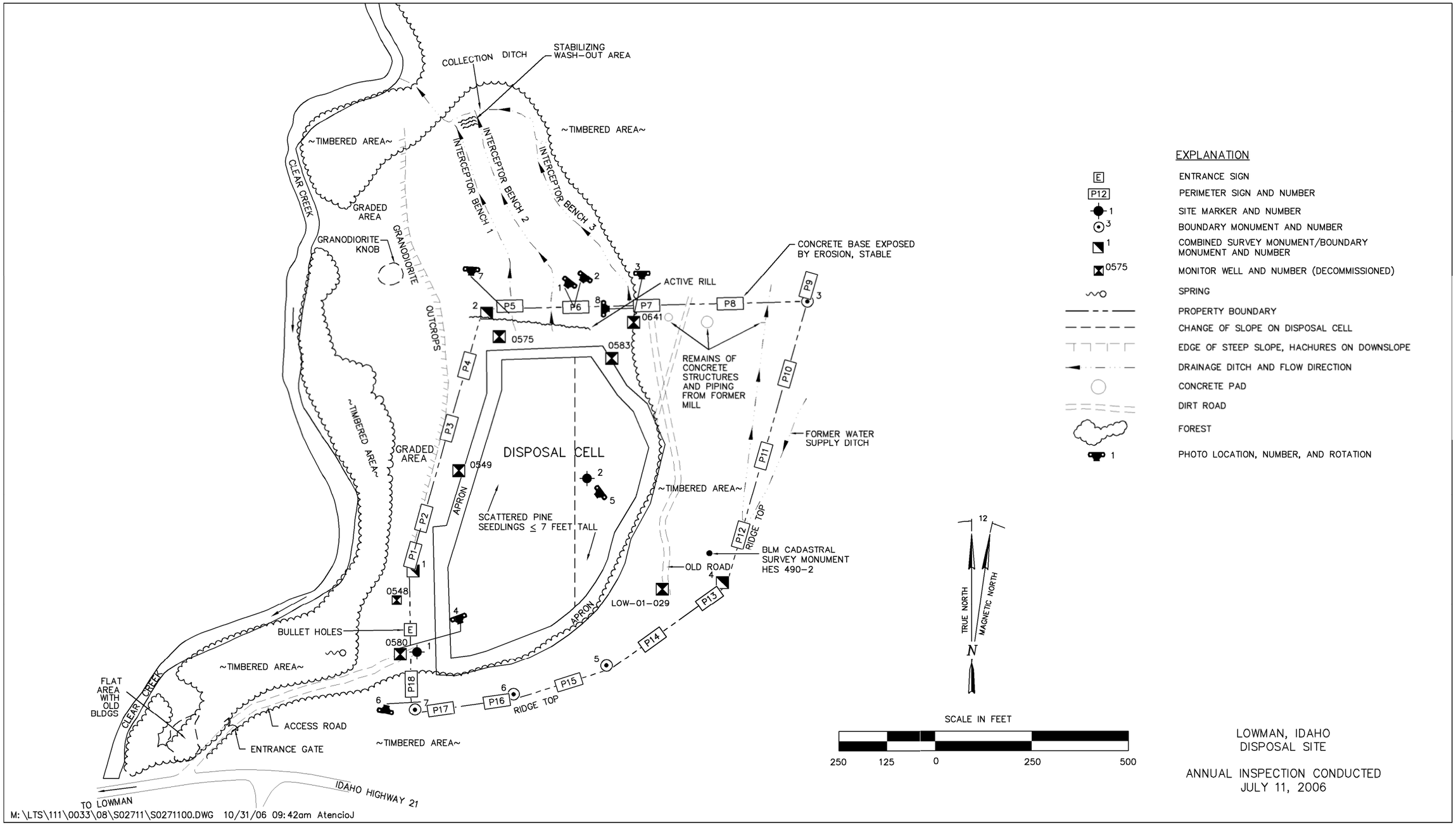


Figure 10–1. 2006 Annual Compliance Drawing for the Lowman, Idaho, Disposal Site

Vegetation encroachment by species including ponderosa pine continues on the top and side slopes of the disposal cell (PL–5). Encroachment is a natural process operating at this location and will be allowed to continue in accordance with the LTSP. Although DOE is no longer required to manage the pine forest as it matures, the revised LTSP states that DOE will repair any damage that may occur to the riprap cover and underlying cover layers to maintain protection from erosion and possible consequent dispersion of cell contents. The largest ponderosa pine trees on the cover are now approximately 7 feet in height. Photograph PL–6 shows the current extent of plant encroachment.

Area Between the Disposal Cell and the Site Boundary—The steep slopes east and south of the site are stable and vegetated with well-established grasses and ponderosa pine trees. One active erosion rill was previously discovered along the north boundary of the site adjacent to perimeter signs P5 and P6; it had bisected the berms of the lower two interceptor benches. The breach in Interceptor Bench 1 was repaired in October 2004, and the breach in Interceptor Bench 2 was repaired in June 2005. Both repairs were in excellent condition (PL–7).

An abandoned access road was improved in order to gain access to monitor well LOW–01–029 for decommissioning purposes. Following decommissioning activities, the road was reclaimed to prevent vehicle use and erosion (PL–8), and was reseeded with native plant seeds.

Concrete structures and piping from the former mill remain in an area northeast of the disposal cell. The structures remain unchanged, and no evidence of intrusion was noted.

Outlying Area—An area within 0.25 mile around the site was visually inspected for evidence of construction, development, logging, or change in land use that might affect the site. No changes were noted to the area across Clear Creek to the west, where several summer cabins are located. The area east and south of the site is U.S. Forest Service land and remains unchanged.

Revegetation efforts on the slopes north and west of the disposal cell have been successful and DOE's erosion control activities on the State of Idaho parcel north of the property are complete. Erosion will continue to be monitored during annual site inspections to ensure protection of the disposal cell and other site surveillance features such as property signs and boundary monuments. If significant erosion is observed on the State parcel and it appears that sediment potentially could enter Clear Creek, DOE will notify the State.

10.3.2 Noxious Weeds

Infestations of the noxious weeds spotted knapweed and dalmatian toadflax continue to persist, and were again identified on and adjacent to the site in 2006. Since 2003, applications of herbicide in both the spring and fall have been effective in significantly reducing the weed populations. DOE will continue to monitor weed infestations and will continue spraying the weeds until they are determined to be under control.

10D

10.3.3 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

10.3.4 Routine Maintenance and Repairs

Seven monitor wells were decommissioned and weeds were sprayed with herbicide in 2006.

10.3.5 Ground Water Monitoring

An evaluation of the cell contents and ground water quality indicated that the disposal cell presents no impact on ground water quality near the site. Consequently, with NRC's concurrence, ground water monitoring at the Lowman site was discontinued after the 2004 sampling event and the wells were decommissioned in 2006.

10.3.6 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

10.3.7 Photographs

Table 10−3. Photographs Taken at the Lowman, Idaho, Disposal Site

Photograph Location Number	Azimuth	Description
PL−1	220	Ponderosa pine trees obscuring view of perimeter sign P6.
PL–2	220	View of perimeter sign P6 after removal of the pine trees.
PL–3	180	Cutting the surface casing of monitor well MW–0641.
PL–4	160	Reclaimed location of decommissioned monitor well MW–0580.
PL–5	235	Fireweed, redosier dogwood, and ponderosa pine on the cell top.
PL–6	15	Plant encroachment on the west portion of the cell top and apron.
PL–7	185	Repaired area on south end of Interceptor Bench 1.
PL–8	90	Reclaimed portion of access road to decommissioned monitor well LOW–01–029.

LOW 7/2006. PL–1. Ponderosa pine trees obscuring view of perimeter sign P6.

LOW 7/2006. PL–2. View of perimeter sign P6 after removal of the pine trees.

LOW 7/2006. PL–3. Cutting the surface casing of monitor well MW–0641.

LOW 7/2006. PL–4. Reclaimed location of decommissioned monitor well MW–0580.

LOW 7/2006. PL–5. Fireweed, redosier dogwood, and ponderosa pine on the cell top.

LOW 7/2006. PL–6. Plant encroachment on the west portion of the cell top and apron.

LOW 7/2006. PL–7. Repaired area on south end of Interceptor Bench 1.

LOW 7/2006. PL–8. Reclaimed portion of access road to decommissioned monitor well LOW–01–029.

11.0 Maybell, Colorado, Disposal Site

11.1 Compliance Summary

The Maybell Disposal Site, inspected on August 11, 2006, is in excellent condition. The disposal cell and all erosion control features were functioning as designed. No deep-rooted plants were found on the cell top. The four remaining monitor wells at the site were decommissioned in accordance with State of Colorado requirements. Healthy vegetation has established on restored areas. License agreement for reuse of the fenced-in former right-of-way reservation north of the site as a livestock management area is in process with a local rancher and BLM. Three uranium exploration claims were found staked onsite inside the perimeter fence. Inspectors identified no cause for a follow-up or contingency inspection.

11.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Maybell, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Maybell, Colorado, Disposal Site* (DOE/AL/62350−247, Rev. 2, U.S. Department of Energy [DOE], Albuquerque Operations Office, July 1999) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 11–1.

Table 11–1. License Requirements for the Maybell, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 11.3.1
Follow-up or Contingency Inspections	Section 5.0	Section 11.3.2
Routine Maintenance and Repairs	Section 4.0	Section 11.3.3
Ground Water Monitoring	Section 2.6	Section 11.3.4
Corrective Action	Section 5.0	Section 11.3.5

Institutional Controls—The 251-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license (10 CFR 40.27) in 1999. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing (perimeter) signs placed along the property boundary, and a locked gate at the site entrance. Verification of these institutional controls is part of the annual inspection.

11.3 Compliance Review

11.3.1 Annual Inspection and Report

The site, located northeast of Maybell, Colorado, was inspected on August 11, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 11–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

11.3.1.1 Specific Site Surveillance Features

Access, Gates, Fence, and Signs—Access to the site is via Moffat County Road 53, a right-of-way crossing BLM property to the disposal site property boundary, just east of the site entrance. The road is graveled, hard packed, and is in good condition. A new sign indicating the end of County Road 53 was erected near the northeast corner of the site. From that point a dirt track continues west across the northern portion of the site and past an abandoned open pit mine (Robb Pit) to the Umetco (Maybell West) UMTRCA Title II disposal site. A drainage swale (Swale No. 1) crosses the access road between the entrance gate and perimeter sign P26. The bottom of the swale at the road crossing is filled with rock for erosion control and is passable.

Two DOE gates cross the dirt road extending from the county road along the northern boundary of the site. Neither gate is locked and there are no cattle guards in the road. These gates provide livestock control to the fenced-in former right-of-way (ROW) area directly north of the site. A third gate crosses the road that leads to a former monitor well location northeast of the site. This unlocked gate and adjoining fence appear to have been installed by the BLM. A fourth gate is the locked entrance gate in the perimeter fence at the north end of the site. A fifth and final locked gate is located directly west of perimeter sign P3 in the northwest corner of the property and provided access to the former monitor wells located in the southwest portion of the property. All the gates are standard tubular metal stock gates and are in good condition.

The standard four-stranded barbed-wire stock fence that surrounds the disposal cell and drainage structures was in good condition. A broken strand of wire was found on the perimeter fence adjacent to the gate in the northwest corner of the property and will be repaired during next year's inspection. Loose wires were also noted at several other locations along the stock fence. Evidence of deer, elk, and pronghorn antelope is abundant on the site, and these big game animals probably are the cause of loose and broken wires often found at the site.

The entrance sign, mounted on a t-post in the fence line, is next to the entrance gate. The sign was in good condition.

A total of 27 perimeter (warning/no trespassing) signs are at the site. On the north, west, and south sides of the site, perimeter signs are on t-posts in the fence line. On the east side of the site, perimeter signs are on the bench about midway between the disposal cell and Johnson Wash where they are mounted on steel posts set in concrete. Perimeter sign P24 was missing and will be replaced during next year's inspection. Several of the signs have bullet holes but were legible (PL–1). The remaining signs were in good condition.

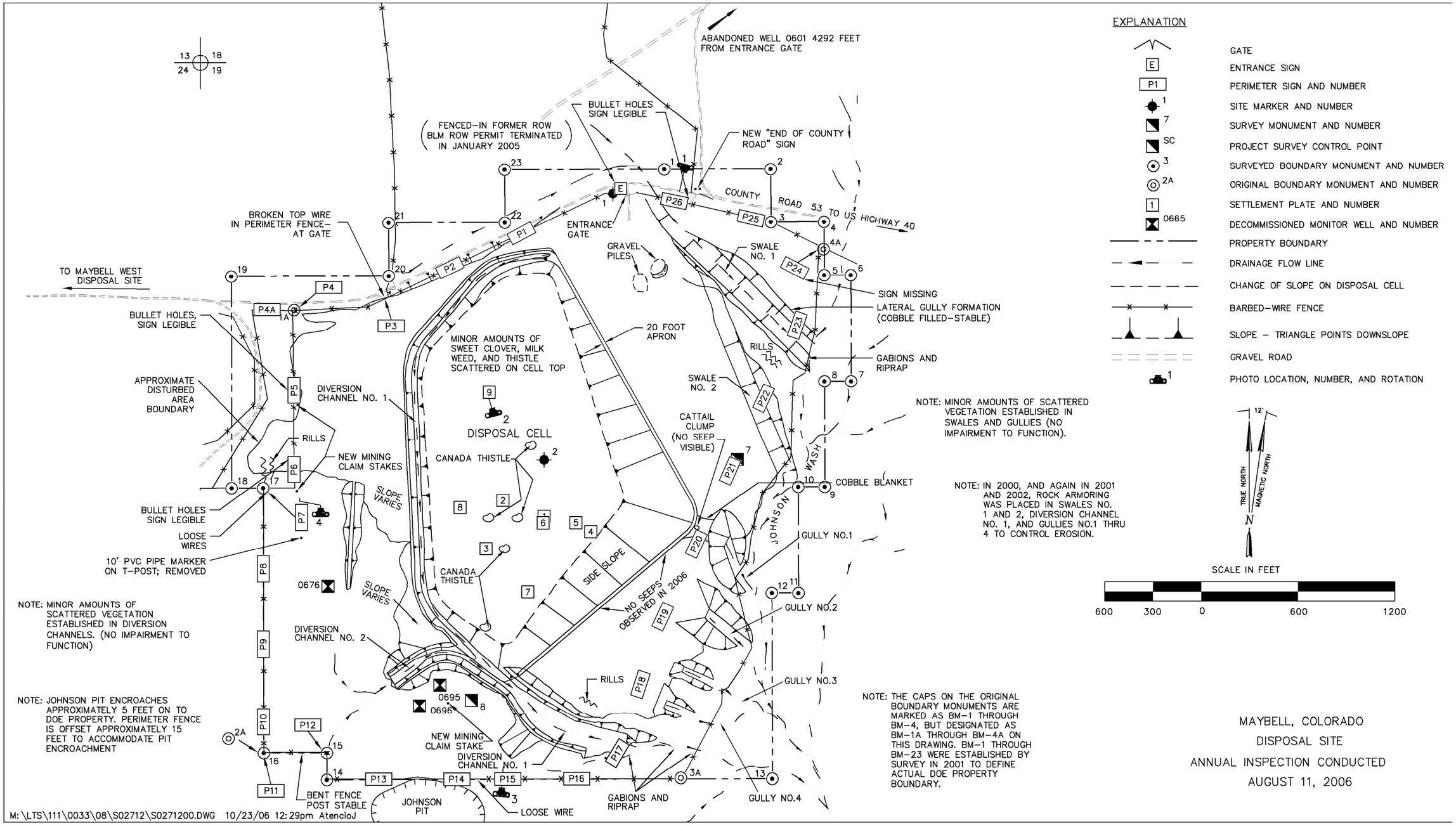


Figure 11–1. 2006 Annual Compliance Drawing for the Maybell, Colorado, Disposal Site

Site Markers and Monuments—The site has two granite site markers, 27 boundary monuments, and two survey monuments. All markers and monuments were in excellent condition.

Settlement Plates—There are nine settlement plates on top of the disposal cell (PL–2). All were secure and in good condition. No visual evidence of settlement occurring on the disposal cell cover was observed in 2006.

Elevations of the settlement plates were last surveyed in July 2004, which concluded the 5-year post-construction annual settlement survey requirement stipulated in the site LTSP. The surveys confirmed visual observations that no significant settlement had occurred on the disposal cell top. Visual observations will continue during annual inspections, and if settlement is observed, resurveying of the settlement plates will be performed.

Monitor Wells—The four remaining monitor wells at the site were decommissioned in
11A accordance with State of Colorado requirements in May 2006. The well casings were grouted and cut two feet below ground surface, the protective surface casings were removed and discarded, and the sites were reclaimed.

11.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the disposal cell; (2) the other areas on site; and (3) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes.

Disposal Cell—The disposal cell is armored with rock for erosion protection and was in excellent condition (PL–3). No evidence of slumping, settling, erosion, or rock degradation was noted.

Minor vegetation encroachment, consisting primarily of grasses and annual weeds, was observed on the cell top and side slopes. No deep-rooted woody plant species were found growing on the disposal cell. Several small patches of Canada thistle, a noxious weed, were observed growing on the disposal cell cover and will be treated with herbicide.

In accordance with the site LTSP, inspectors looked for seeps on the northeast and southeast side slopes because large quantities of slimes were encapsulated in this portion of the cell. No seeps were observed. The east corner of the cell is a topographic low point for draining a portion of runoff from the cell. No moisture was evident on the surfaces of the side slopes. Runoff water often is present in the apron at this location; the cobble blanket at the toe of the east corner supports wetland vegetation and other annual and perennial plants. No standing water was noted at the time of the inspection.

Other Areas Inside the Site Boundary—The rock-armored diversion channels, swales, and gullies were in good condition. Regional drought conditions in recent years have resulted in very

little water drainage from the disposal site. Although slightly above average precipitation was received over the past two years at the site, the armored drainage channels and gullies were dry at the time of the 2006 inspection. There was no evidence of sediment moving offsite into Johnson Wash, and formerly active rills and gullies are stabilizing due to self-armoring and increased vegetation. No new head cutting was observed. Evidence of erosion will continue to be monitored during annual site inspections.

Vegetation in the reclaimed areas on the site was diverse and healthy. In January 2005, based on successful reclamation, the remedial action agreement with the BLM was considered terminated.

Three claim stakes were found inside the perimeter fence several hundred feet west and
11B southwest of the disposal cell. BLM confirmed that they are uranium exploration claims staked by Western Fuels Incorporated (PL–4). BLM also confirmed that all BLM property withdrawn and transferred to DOE for the disposal site includes subsurface rights. Two private parcels of land purchased in fee simple by the State of Colorado and acquired by DOE for the site are currently being researched to determine if subsurface rights were included with the transfer.

Outlying Area—The area outside the site boundary for 0.25 mile was visually inspected. There was no evidence of erosion, development, change in land use, or other phenomenon that might affect the long-term performance of the site.

11C In September 2004, DOE received written concurrence from BLM that the ROW reservation directly north of the site had revegetated successfully, with no erosion occurring; therefore, relinquishing the permit for the reclaimed reservation area. At the request of a local rancher, and with the approval of BLM and DOE, the fenced-in former ROW area, of which a small portion lies on DOE property, is planned for reuse as an enclosure for livestock management. BLM and DOE are currently in the process of placing the area under license agreement with the rancher for this purpose. The license agreement will ensure access across the enclosure, direct repair of the perimeter fence from damage caused by livestock, and address liability concerns.

Directly south of the site is a former open pit uranium mine referred to as the Johnson Pit. Minor encroachment (approximately 5 feet) of the Johnson Pit onto DOE property at the south end of the site has occurred. No evidence of recent encroachment was observed. The perimeter fence in this location diverts approximately 15 feet off of an east/west line to accommodate this minor encroachment. The encroachment of the Johnson Pit onto DOE property does not adversely affect the disposal cell or any of the associated erosion control features.

11.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

11.3.3 Routine Maintenance and Repairs

No maintenance or repairs were performed at the disposal site in 2006.

11.3.4 Ground Water Monitoring

Ground water at this site is contaminated as a result of widespread, naturally occurring uranium mineralization and mining activities not related to on-site legacy uranium processing operations. The ground water in the area is designated as limited use. Limited use is a designation given to ground water that is not a current or potential source of drinking water because it contains widespread ambient contamination that cannot be cleaned up by methods reasonably employed in public water systems. Narrative supplemental standards (40 CFR 192.21 (g)) have been applied to ground water at the site, and therefore, in accordance with the site LTSP, ground water quality monitoring is not required.

Ground water level monitoring was conducted in accordance with the LTSP from November 1995 through March 2004 (in excess of the required 5-year period), to determine the interaction of transient drainage from the disposal cell on the local ground water system. Water level measurements were discontinued in 2004 following the conclusion that there was no evidence of any transient drainage interaction with the local ground water system near the disposal cell. NRC concurrence with this conclusion was received in January 2005.

11.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

11.3.6 Photographs

Table 11–3. Photographs Taken at the Maybell, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	195	Perimeter sign P26 showing bullet holes; legible.
PL–2	345	Settlement Plate No. 9.
PL–3	5	North view of the disposal cell.
PL–4	360	Information plate on a new survey stake located inside the west property boundary.

MAY 8/2006. PL–1. Perimeter sign P26 showing bullet holes; legible.

MAY 8/2006. PL–2. Settlement Plate No. 9.

MAY 8/2006. PL–3. North view of the disposal cell.

MAY 8/2006. PL–4. Information plate on a new survey stake located inside the west property boundary.

End of current section.

12.0 Mexican Hat, Utah, Disposal Site

12.1 Compliance Summary

The Mexican Hat, Utah, Disposal Site, inspected on April 26, 2006, was in good condition. Runoff from storm events continues to transport sediment into the west diversion channel resulting in vegetation growth within the channel; performance of the diversion channel has not been impaired. Repairs were made to the perimeter fence, boundary monument BM–7, and perimeter sign P27. The entrance gate was found damaged, however, vehicles are still able to access the site; therefore, no repairs are planned at this time. Tamarisk plants found on site were cut and treated with herbicide. Trash and tumbleweeds continue to accumulate on the site and along sections of the perimeter fence and may require maintenance in the future. An evaluation of the monitoring program was conducted and presented in the draft report *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site* (March 2006). Recommendations to discontinue seep water quality monitoring and to continue annual observations of seep flows were conditionally concurred in by the Navajo Nation; NRC approval is pending. Navajo Nation concurrence to decommission the four remaining ground water monitoring wells at the site was received. No cause for a follow-up or contingency inspection was identified.

12.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Mexican Hat, Utah, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Mexican Hat Disposal Site, Mexican Hat, Utah* (DOE/AL/62350–207, Rev. 2, U.S. Department of Energy [DOE], Albuquerque Operations Office, June 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 12–1.

Table 12-1. License Requirements for the Mexican Hat, Utah, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.1	Section 12.3.1
Follow-up or Contingency Inspections	Section 3.4	Section 12.3.2
Routine Maintenance and Repairs	Section 5.0	Section 12.3.3
Ground Water Monitoring	Section 4.3	Section 12.3.4
Corrective Action	Section 6.0	Section 12.3.5

Institutional Controls—The 119-acre disposal site is held in trust by the United States of America for the Bureau of Indian Affairs; the Navajo Nation retains title to the land. DOE and the Navajo Nation executed a Custodial Access Agreement (CAA) that conveys to the federal government title to the residual radioactive materials stabilized at the repository site and ensures that DOE has perpetual access to the site. UMTRCA authorized DOE to enter into Cooperative Agreement (CA) (DE-FC04-85AL26731) with the Navajo Nation and the U.S. Nuclear Regulatory Commission (NRC) required it prior to bringing the site under the general license. The purpose of the CA was to perform remedial actions at the former processing sites. The site was accepted under the NRC general license (10 CFR 40.27) in 1997. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody

and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal control of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

12.3 Compliance Review

12.3.1 Annual Inspection and Report

The site, located south of Mexican Hat, Utah, was inspected on April 26, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 12–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

12.3.1.1 Specific Site Surveillance Features

Access, Fence, Gate, and Signs—The site is accessed via a short unmarked dirt road off U.S. Highway 163 that ends at a graded parking area. An eroded channel is developing on the access road between the parking area and the entrance gate; vehicular access may become difficult in the future. No repairs are necessary at this time.

A barbed-wire perimeter fence set inside the property boundary, with a chain-link gate at the site entrance, encloses the site. The center rod to the entrance gate was damaged, causing the west half to be inoperable; however, vehicles can still access the site through the east half of the gate and, therefore, no repairs are planned at this time (PL–1). Damage caused by livestock to the
12A perimeter fence in two locations was repaired: at the north end of the west diversion channel near its outlet and directly north of the east toe drain to the disposal cell.

An entrance sign is located at the gate and was in excellent condition. There are 43 perimeter sign locations along the property boundary and each location has a pair of signs: an upper property ownership sign and a lower radioactive materials disposal site warning sign. Some perimeter signs have bullet holes or were dented but were legible. Perimeter sign P27, located on the south property boundary adjacent to the road edge and found damaged by a vehicle during
12B last year's inspection, was repaired and relocated off the edge of the road. Perimeter sign P37 was missing the lower radioactive materials disposal site warning sign. The remaining signs were in excellent condition.

Site Markers and Monuments—The two site markers, four survey monuments, and 12 boundary monuments were inspected. All site markers were in good condition. Boundary monument BM–7 located in the southwest corner of the property on the side of a dirt road, and
12C found damaged by a vehicle during last year's inspection, was repaired. Boundary monument BM–11, located in an area subject to erosion, remains stable. The markings on survey monument SM–5 are illegible; however, no action is required at this time. All other boundary and survey monuments were in good condition.

Monitor Wells—Three monitor wells (MW–0899, MW–0934, and MW–0935) are located onsite and are in good condition. Because ground water monitoring is not required by the LTSP, NRC approval and Navajo Nation concurrence were received to decommission these wells and is planned in 2007.

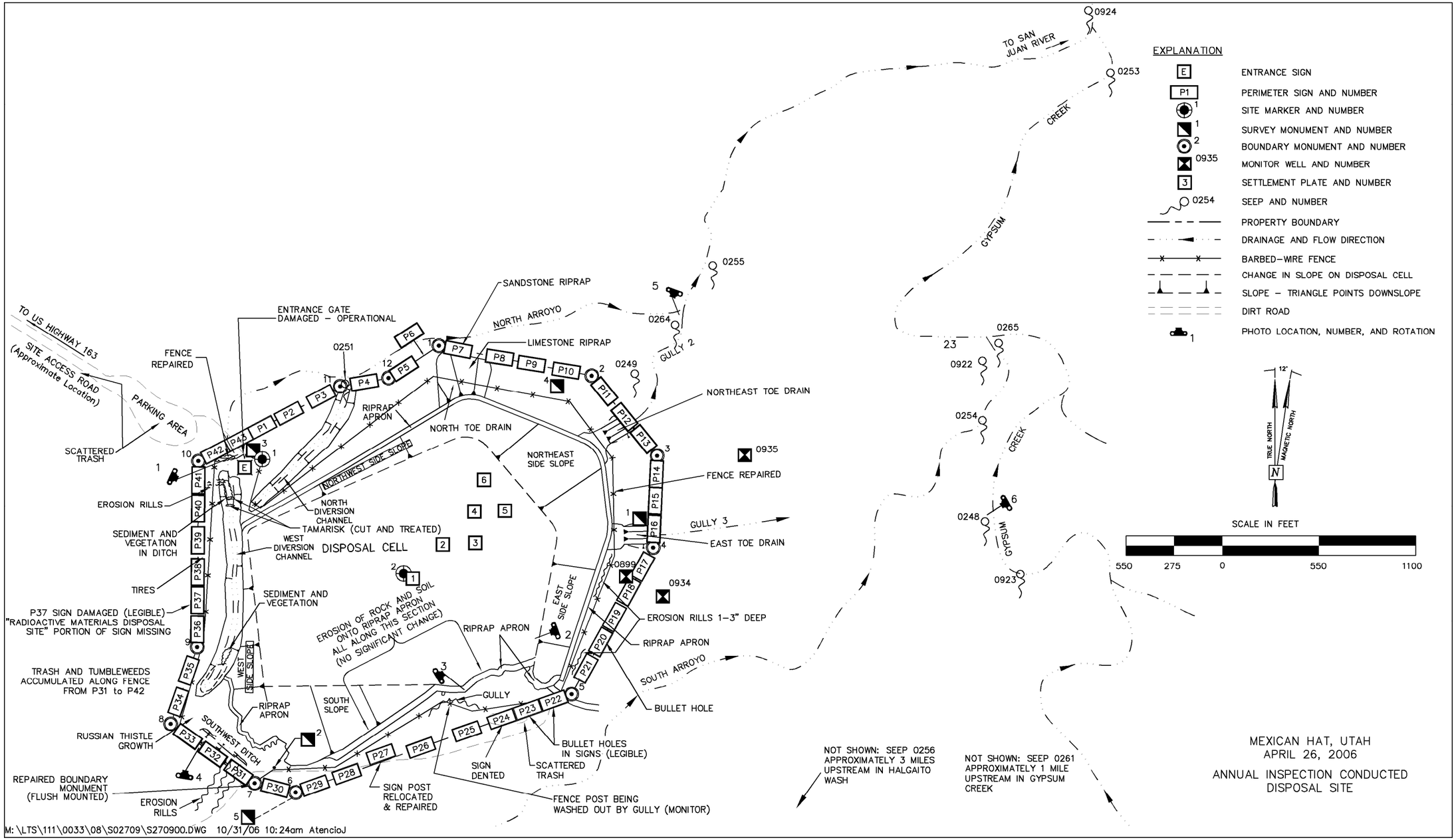


Figure 12–1. 2006 Annual Compliance Drawing for the Mexican Hat, Utah, Disposal Site

12.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the riprap-covered disposal cell top slope; (2) the riprap-covered side slopes and diversion ditches; (3) the area between the disposal cell and the site boundary; and (4) the outlying area. The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes.

Top of Disposal Cell—The top of the riprap-armored disposal cell was in excellent condition (PL–2). There was no evidence of differential settling, cracking, burrowing, or other modifying process that could affect the integrity of the cell. All visible components of the disposal cell and cover were functioning as designed. No vegetation was observed to be growing on top of the disposal cell.

Side Slopes and Diversion Ditches—Inspectors saw no evidence of differential settling, slumping, or other evidence of instability on the side slopes of the disposal cell.

A section along the south apron has been closely monitored since construction because rock and soil have sloughed off the adjacent steep hill slope onto the apron. Based on comparisons with photographs from previous inspections, there was no significant increase in accumulation of the red sandstone and soil along the south apron (PL–3). As observed in past years, there was no evidence of channel erosion in this area, and the sloughed material has not filled the void spaces in the apron riprap beyond the toe of the hill slope. It is anticipated that a minor amount of unstable rock from the hill slope will, over time, continue to fall onto the apron; however, the amount of material that will eventually accumulate on the edge of the apron in this area will have no detrimental impact on the performance of the apron or the disposal cell. However, as a best management practice, inspectors will continue to observe material that has fallen and accumulated on the edge of the apron in this area.

Areas off-site and upgradient continue to erode and transport sediment into the west diversion channel and the southwest ditch. Plant growth, primarily annual weeds, is establishing where the sediment has accumulated in the west diversion channel (PL–4). The sediment accumulation and plant growth have not affected the performance of these storm water diversion structures, and the rate of sedimentation is expected to diminish as the upgradient landscape stabilizes.

12D Tamarisk, a deep-rooted noxious plant, found growing within the outlet of the west diversion channel, was cut and treated with herbicide.

Area Between the Disposal Cell and the Site Boundary—Minor erosional rills and gullies are present upstream of the west diversion channel and southwest ditch, and along the east side slope of the cell. Though some sediment is entering the diversion structures, these erosion features are not a problem and are expected to stabilize. Hill slopes around the disposal cell remain stable with only minor accumulations of loose material at the toe of the slopes.

Scattered trash continues to accumulate in and adjacent to the site. Although most of the trash remains offsite, incremental trash removal will be performed as part of the annual inspections.

Vehicle tracks continue to be observed in the areas between the perimeter fence and the site boundary, indicating occasional trespass onto the disposal site property. Trash accumulations and trespassing will continue to be monitored; currently, they are not affecting the integrity of the site.

Outlying Area—The area surrounding the site was visually inspected for signs of erosion, development, or other disturbance that might affect site integrity or security. Sediment erosion and deposition, trash accumulation, and evidence of off-road vehicle activity continue adjacent to the site. However, the site remains secure and these off-site conditions are not affecting the integrity or the performance of the site.

12.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

12.3.3 Routine Maintenance and Repairs

Repairs were made to the perimeter fence, boundary monument BM–7, and perimeter sign P27, and tamarisk plants found on site were cut and treated with herbicide in 2006.

12.3.4 Ground Water Monitoring

Ground water in the uppermost aquifer beneath the site is not affected by the disposal cell or by legacy uranium processing-site activities because of an effective aquitard and an upward hydraulic gradient. Both of these hydrogeologic conditions prevent any downward migration of overlying water into the uppermost aquifer; therefore, monitoring of ground water within this aquifer is not required by the LTSP. However, due to concerns raised by the Navajo Nation, ground water monitoring was performed at the site from November 2000 to August 2002, as a best management practice. This monitoring was performed to demonstrate analytically that no site-related contamination occurred in the uppermost aquifer and that the upward hydraulic gradient continued. The ground water monitoring results from this two-year period confirmed these conditions existed and are presented in the draft report *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site* (March 2006). This report was submitted to the Navajo Nation in March 2006. In July 2006, the Navajo Nation's concurrence was received to decommission the remaining four monitor wells at the site. Well decommissioning is planned for 2007.

12E

12.3.5 Seep Monitoring

From 1998 through 2005, in accordance with the LTSP and when sufficient flows have allowed, seep water quality monitoring was performed as a best management practice to monitor cell performance due to concerns raised by the Navajo Nation. In 2006, an evaluation of the seep-monitoring program was conducted and presented in the draft report *Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site* (March

2006). Based on the monitoring results, the hydrogeological conditions at the site, the continued low yield (flows) from the seeps, and the absence of any receptors to demonstrate risk, a recommendation was made to discontinue water quality monitoring of the seeps. Annual observations of the seep flow rates will continue with the understanding that if they significantly increase, as compared to historical levels, water quality monitoring would resume. In August 2006, the Navajo Nation conditionally concurred to these recommendations and the draft report was submitted to the NRC; approval is pending.

12F

In accordance with recommendations discussed above, visual monitoring of seep flows was conducted during the annual inspection. The flows of six seeps were observed and documented to be negligible (Table 12–2). All seeps observed are listed in the LTSP, except Seep 0264 (which replaced Seep 0249 in 1995 because of insufficient flow for sampling). Only a minor amount of standing water was found in two of the seeps, 0264 and 0248 (PL–5 and PL–6); the remaining four seeps were either dry or with moist soil. Table 12–2 provides observations and descriptions of seep flows (qualitative). Photographic documentation was also collected.

Table 12-2. Observation and Description of Seeps at the Mexican Hat, Utah, Disposal Site

Seep Location Number	Drainage	Flow Orientation from Disposal Cell	Observations and Descriptions of Seep Flow (Qualitative)
0248	Gypsum Creek	Downgradient	Minimal seep flow (dripping from rock outcrop), very small pool of standing water (~1' diameter, ~1" depth), soils moist in surrounding area against rock outcrop, no flow from immediate area, minimal vegetation – primarily tamarisk (very little other riparian vegetation).
0249	Gully 2	Downgradient	Dry, no flow or standing water, no evidence of seep (i.e.; no moist soils or riparian vegetation were present).
0251	North Arroyo	Downgradient	Dry, no flow or standing water, slightly moist soil in a very small and localized area against rock outcrop, small amount of evaporite present, minimal vegetation – primarily tamarisk (very little other riparian vegetation).
0254	South Arroyo	Downgradient	Dry, no flow or standing water, evaporite present is the only evidence of soil moisture or seep (very little riparian vegetation).
0264	North Arroyo	Downgradient	Most significant flow (still minimal), no flow occurring past the immediate wetted area (~ 15' x 25'), several small pools of standing water (~1' diameter, ~1" depth) occur within the wetted area, riparian vegetation occurs within the wetted area (including tamarisk).
0922	South Arroyo	Downgradient	Small area of moist soil and evaporite present beneath rock outcrop, no flow or standing water, some riparian vegetation (including tamarisk).

Note – Warning signs, that stipulate to not drink the water, remain posted at the seeps.

12.3.6 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

12.3.7 Photographs

Table 12–4. Photographs Taken at the Mexican Hat, Utah, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	115	Entrance gate (showing bent center rod) and sign, site marker; disposal cell in the background.
PL–2	250	View southwest across the cell top from the crest of the east side slope of the cell; south slope of the cell top in the background.
PL–3	60	View northeast along the southeast apron showing insignificant accumulation of detritus.
PL–4	10	Sediment and vegetation in the upper reach of the west diversion channel.
PL–5	200	Seep 0264.
PL–6	240	Seep 0248.

HAT 4/2006. PL–1. Entrance gate (showing bent center rod) and sign, site marker; disposal cell in the background.

HAT4/2006. PL–2. View southwest across the cell top from the crest of the east side slope of the cell; south slope of the cell top in the background.

HAT 4/2006. PL–3. View northeast along the southeast apron showing insignificant accumulation of detritus.

HAT 4/2065. PL–4. Sediment and vegetation in the upper reach of the west diversion channel.

HAT 4/2006. PL–5. Seep 0264.

HAT 4/2006. PL–6. Seep 0248.

End of current section.

13.0 Naturita, Colorado, Disposal Site

13.1 Compliance Summary

The Naturita, Colorado, Disposal Site was inspected on April 20, 2006, and was in excellent condition. The access road to the monitor wells, regraded after the 2005 inspection, was in excellent condition. Noxious weeds were sprayed with herbicide. Based on 2006 sample results, a recommendation to discontinue ground water monitoring at the site will be made to the U.S. Nuclear Regulatory Commission (NRC). No other maintenance needs or cause for a follow-up or contingency inspection were identified.

13.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Naturita, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Upper Burbank Disposal Cell, Uravan, Colorado* (DOE/AL/62350−250, Rev. 1, U.S. Department of Energy [DOE], Albuquerque Operations Office, July 1999) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 13–1.

Table 13-1. License Requirements for the Naturita, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.1 and 6.2	Section 13.3.1
Follow-up or Contingency Inspections	Section 3.4	Section 13.3.2
Routine Maintenance and Repairs	Section 4.0	Section 13.3.3
Ground Water Monitoring	Section 2.6.2	Section 13.3.4
Corrective Action	Section 5.0	Section 13.3.5

Institutional Controls—The 26.65-acre disposal site is owned by the United States of America and was accepted under the NRC general license (10 CFR 40.27) in 1999. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site access road. Verification of these institutional controls is part of the annual inspection.

13.3 Compliance Review

13.3.1 Annual Inspection and Report

The site, located west of the former community of Uravan, Colorado, was inspected on April 20, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 13–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

13.3.1.1 Specific Site Surveillance Features

Access Roads, Gates, Fence, and Signs—Access to the Naturita Disposal Site is from Montrose County Road EE22 that intersects State Highway 141 at Uravan, Colorado. Road EE22 approaches the site from the northwest and continues (offsite) along the northeast side of the disposal cell. The graveled county road was in good condition.

The entrance gate, located northwest of the disposal cell off of Road EE22, consists of a locked pair of tubular metal gates suspended from galvanized steel gateposts. A chain and padlock secure the gate. The road through the entrance gate provides access to monitor wells adjacent to the west side of the cell. This road, regraded after the 2005 inspection, was in excellent condition (PL–1). Two metal gates on the monitor well access road also were in good condition.

A barbed-wire stock fence encloses the site. The fence was in excellent condition. Cattle grazing should be of little concern because forage within the site or in the immediate area is minimal.

The site has 25 perimeter signs and one entrance sign. Perimeter signs, mounted on steel posts, are set approximately 5 feet inside the perimeter fence. Perimeter sign P2 has bullet holes but remains legible. The other 24 perimeter signs and the entrance sign were in good condition.

Site Markers and Monuments—The two granite site markers, SMK−1 and SMK−2, were undisturbed and in excellent condition.

The site property boundary has 17 corners, which are marked by either boundary monuments or survey monuments. Boundary monuments are designated BM–1 through BM–17. Three survey monuments SM−3, SM−4, and SM−11 are used in lieu of boundary monuments BM–3, BM–4, and BM–11. Survey monuments were installed during site construction for survey control; boundary monuments were installed after completion of construction to delineate the final property boundary. Both types of monuments are located with the same precision. All boundary and survey monuments were undisturbed and in excellent condition.

Monitor Wells—The ground water monitoring network has five wells: BR95–1, BR95–2, BR95–3, CM93–1 and CM93–2. All monitor wells were secure and in good condition.

13.3.1.2 Transects

To ensure a thorough and efficient inspection, the site is divided into four areas referred to as transects: (1) the riprap-covered top slope and side slopes of the disposal cell; (2) the riprap-covered toe drains and toe drain outlets; (3) the riprap-covered interceptor channel; and (4) the outlying area. A fifth transect identified in the LTSP consisted of the reclaimed areas surrounding the disposal cell. Vegetation cover in this area is well established, and a storm water discharge permit that addressed this area has been closed with regulator concurrence. Therefore, this transect is no longer formally inspected.

Within each transect, inspectors examined specific site surveillance features, such as monitor wells, survey and boundary monuments, signs, and site markers. Inspectors examined each transect for evidence of erosion, settling, slumping, or other disturbance that might affect site integrity or the long-term performance of the site.

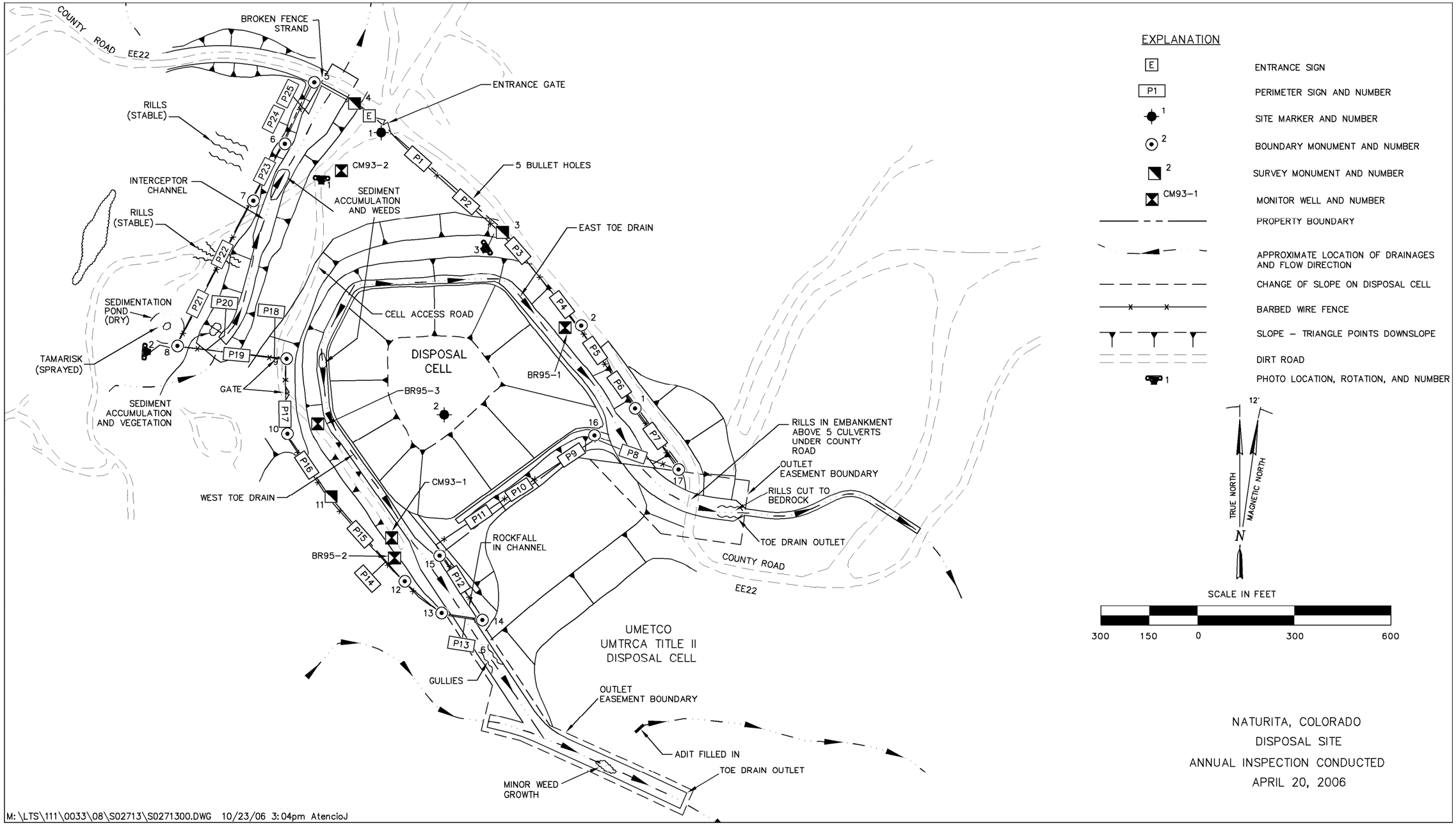


Figure 13-1. 2006 Annual Compliance Drawing for the Naturita, Colorado, Disposal Site

Top of Disposal Cell and Side Slopes—The disposal cell was completed in 1998. Rock covers the 2-acre top of the disposal cell and the approximate 8 acres of side slopes (PL–2). The rock is rounded, with larger rock on the side slopes than on the top. The rock-covered surfaces showed no signs of disturbance except on the southwest side of the top surface. This is an area where a standpipe was removed several years ago and the slightly irregular surface is the result of that activity. The remaining portions of the cell top and side slopes of the disposal cell were in excellent condition. No evidence of subsidence, differential settlement, slumping, or other modifying process was noted, and no vegetation was present.

Toe Drains and Outlets—Two riprap-armored toe drains collect water from the cell side slopes and divert it to the southeast. The toe drain on the west side of the cell exits through a channel quarried through the wall of the Burbank Pit and into Hieroglyphic Canyon and finally to the San Miguel River. Some sediment has accumulated in the upper end of the western toe drain allowing scattered weeds and grasses to grow. Farther down this drain beyond the armored portion, water is beginning to erode softer bedrock. This erosion does not affect the performance of the toe drain, but will continue to be monitored.

The east toe drain (PL–3) extends through the adjacent Umetco UMTRCA Title II disposal site and crosses beneath County Road EE22 through five culverts. Rills are present in the road embankment over the culvert outlets but are not impacting the road surface at this time. Minor erosion of loose material has occurred in the drain outlet area, but the underlying sandstone bedrock limits further erosion. No water was observed in the drain.

Interceptor Channel—A riprap-armored interceptor channel, upgradient and northwest of the disposal cell, diverts storm water and snowmelt run-on to the northeast across County Road EE22. Some erosion has occurred outside the property uphill from perimeter signs P23 and P21 resulting in deposition of sediment in the channel. The rills appear to be stable, and vegetation is establishing in the accumulated sediment in the channel. Otherwise, the channel is in excellent condition and the sediment and vegetation does not impair the function of the channel. No culvert was installed where the channel crosses the road, so the road could be damaged when storm water exits the channel.

Outlying Area—The site boundary and the area within 0.25 mile of the site boundary have been highly disturbed by mining, quarrying, and road building activities. Umetco is continuing to work on its tailings pile across County Road EE22 east of the site. Umetco's completed UMTRCA Title II disposal cell abuts the Naturita disposal cell on the southeast.

Tamarisk and the noxious weeds Russian knapweed and halogeton on and adjacent to the site were sprayed with herbicide in 2004 and 2005, and only a few live plants were observed during the 2006 inspection. These plants and new weed growth were sprayed during the summer of
13A 2006 in the apparently successful effort to control them. Although the abundance of weeds has significantly decreased, ongoing construction activities near the site will continue to disturb the land and probably result in the need for continued weed control.

13.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

13.3.3 Routine Maintenance and Repairs

DOE applied herbicide to control noxious weeds in 2006.

13.3.4 Ground Water Monitoring

Monitor Wells—DOE monitors ground water at the site as a best management practice to demonstrate the initial performance of the disposal cell. The compliance strategy is to not exceed maximum concentration limits (MCLs) established in Table 1 to Subpart A of 40 CFR 192 or background levels in a point-of-compliance well (CM93−2) in the uppermost aquifer (Wingate Sandstone) downgradient from the disposal cell. The Wingate Sandstone lies approximately 600 feet beneath the disposal cell and is hydrologically isolated from the surface by unsaturated sandstone and relatively impermeable shale layers (aquitard) of the Salt Wash Member of the Morrison Formation and the Summerville Formation, respectively.

Ground water monitoring is performed in three shallower monitor wells (BR95−1, BR95−2, and BR95−3), completed at the contact between the Salt Wash Member and the Summerville Formation, to provide early warning of possible migration of contaminants. If contamination suspected to be related to the disposal cell is observed at this horizon, DOE will sample two deeper wells (CM93−1 and CM93−2) screened in the uppermost aquifer (Wingate Formation). Indicator analytes are arsenic, molybdenum, and uranium. In accordance with the LTSP, monitor wells are to be sampled every other year, beginning in 2000, after licensing of the site was completed (1999).

In 2006, concentrations of arsenic in ground water in the three shallower monitor wells (BR95−1, BR95−2, and BR95−3) ranged from 0.0003 to 0.0012 milligrams per liter (mg/L)—well below the MCL of 0.05 mg/L. The highest concentration of molybdenum in 2006 was 0.015 mg/L, which also is well below the MCL of 0.1 mg/L.

The 2006 uranium concentrations in monitor wells BR95−1, BR95−2, and BR95−3 ranged from 0.027 to 0.11 mg/L (MCL is 0.044 mg/L) (Figure 13–2). Each well indicated very slight increases over the 2004 results that ranged from 0.025 to 0.1 mg/L. Concentrations of uranium in this range are not unexpected at the contact between the Salt Wash Member and the Summerville Formation because uranium mineralization is present in the Salt Wash Member. An indication of the intrinsic mineralization of this ground water is the high level of uranium (2.59 mg/L in April 2001, Umetco result) in seep water approximately 0.5 mile north of the disposal cell. The seep is cross gradient from the disposal cell and represents natural discharge from the Salt Wash/Summerville contact.

Monitor wells CM93−1 and CM93−2 in the uppermost aquifer (Wingate Sandstone) were last sampled in May 1997, and concentrations of all indicator analytes were at or near detection limits and thus well below the respective MCLs.

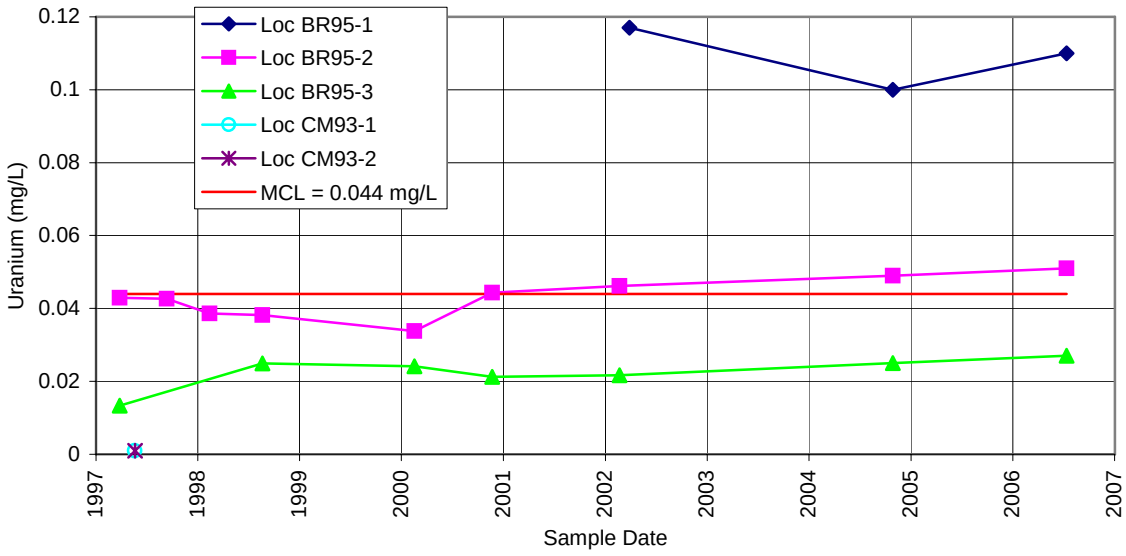


Figure 13-2. Time-Concentration Plots of Uranium in Ground Water at the Naturita, Colorado, Disposal Site

In accordance with the LTSP, the need for continued ground water monitoring was evaluated following 5 years of monitoring (the 2004 sampling event). The monitoring evaluation recommended a reduction in ground water monitoring. This recommendation considered the following information: (1) the uppermost aquifer is hydrologically isolated from the surface by an aquitard consisting of unsaturated sandstone and relatively impermeable shale layers; (2) historical monitoring has demonstrated contamination does not occur within the uppermost aquifer; and (3) naturally occurring uranium mineralization affects water quality within the surface formation on which the disposal cell is constructed. Based on that evaluation and the
13B 2006 sampling results, DOE plans to recommend discontinuance of ground water monitoring altogether. This change in monitoring is dependent on NRC concurrence.

13.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

13.3.6 Photographs

Table 13–2. Photographs Taken at the Naturita, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description of Photograph
PL–1	185	Site access road to monitor wells.
PL–2	95	The disposal cell viewed from boundary monument BM–8.
PL–3	240	The northwest corner of the disposal cell showing the east toe drain.

NAD 4/2006. PL–1. Site access road to monitor wells.

NAD 4/2006. PL–2. The disposal cell viewed from boundary monument BM–8.

NAD 4/2006. PL–3. The northwest corner of the disposal cell showing the east toe drain.

14.0 Rifle, Colorado, Disposal Site

14.1 Compliance Summary

The Rifle Disposal Site was inspected on August 9, 2006, and was in good condition. The entrance sign was replaced. Debris washed onto the access road from runoff was removed. Repairs made in 2005 to the upper interceptor trench remain effective. Pore water continued to be removed from the disposal cell and pumped to an evaporation pond; the Long Term Surveillance Plan (LTSP) pore water elevation action level was not exceeded. Surveys performed in November 2005 determined that the standpipes on the disposal cell were tilted slightly down slope (5% maximum) and that the settlement plates on the disposal cell showed no lateral or down slope movement, but did have a slightly lower elevations (0.46 ft maximum). Annual resurveying of these features will be performed for several years to ensure that no disposal cell movement down slope is occurring. Several tamarisk plants located on site were cut and treated with herbicide. Following reseeding in 2005, a mixture of weeds and desirable perennial species continues to cover the revegetated 16-acre right-of-way area on Bureau of Land Management (BLM) land south of the site. There was no requirement for a follow-up or contingency inspection.

14.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Rifle, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Estes Gulch Disposal Site near Rifle, Colorado* (DOE/AL/62350–235, Rev. 1, U.S. Department of Energy [DOE], Albuquerque Operations Office, November 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 14–1.

Table 14–1. License Requirements for the Rifle, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 14.3.1
Follow-up or Contingency Inspections	Section 3.4	Section 14.3.2
Routine Maintenance and Repairs	Section 4.0	Section 14.3.3
Ground Water Monitoring	Section 2.6 and Appendix	Section 14.3.4
Corrective Action	Section 5.0	Section 14.3.5

Institutional Controls—The 205-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license (10 CFR 40.27) in 1998. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, access control fencing, warning/no trespassing signs placed along the disposal cell boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

14.3 Compliance Review

14.3.1 Annual Inspection and Report

The site, located five miles north of Rifle, Colorado, was inspected on August 9, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 14–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

14.3.1.1 Specific Site Surveillance Features

Access Road, Gates, Fence, and Signs—The site is accessed from a gravel road off of State Highway 13; the gravel access road is approximately a mile long and in good condition. In 2006,
14A debris washed on to the access road from a heavy precipitation event was removed. A perpetual right of way across BLM property provides access to the site. Two gates are installed on the access road. The first gate, installed along the access road where it passes through a narrow road cut, limits site intrusion and helps prevent vandalism to the cell dewatering system. The second gate is the site entrance gate; it consists of a pair of tubular metal gates hinged to galvanized steel posts installed in the barbed-wire stock fence south of the disposal cell and evaporation pond. A chain and padlock secures both gates. The gates were both locked and in excellent condition.

The barbed-wire stock fence, which extends to the edge of steep-sided arroyos that bound the site on the east and west sides, continues to prevent cattle from entering and grazing near the cell. Minor repairs are needed along the fence, but it continues to remain functional. There was evidence of wildlife (elk and deer) crossing the fence and grazing in the revegetated areas adjacent to the disposal cell.

The entrance sign, again found missing at the time of the inspection, was replaced. Perimeter
14B sign P9, that was located directly east of the entrance sign and found missing in 2005, will not be replaced. Two other perimeter signs have bullet damage but remain legible. The remaining perimeter signs were in excellent condition.

Markers and Monuments—Two granite site markers, one just inside and left of the entrance gate and the other on the disposal cell, were undisturbed and in good condition (PL–1).

There are three survey monuments and 15 boundary monuments at this site. Boundary monuments are set at corners along an irregular site boundary. The site boundary has 20 corners; however, monuments were not set at 5 of the corners because of the rough terrain. Consequently, boundary monument locations BM–8, BM–9, BM–13, BM–17, and BM–20 were only marked with wooden lath, and are not included as part of the annual inspection. Many of the survey and boundary monuments at this site are difficult to locate because trees, brush, and rough terrain obscure them. All survey and boundary monuments inspected were found to be in good condition.

Standpipes—Three standpipes, MW–01, MW–02, and MW–03, are located on the south sideslope of the disposal cell and in good condition. Dataloggers with remote data transfer systems (i.e.; telemetry) are installed in MW–02 and MW–03 to measure water level

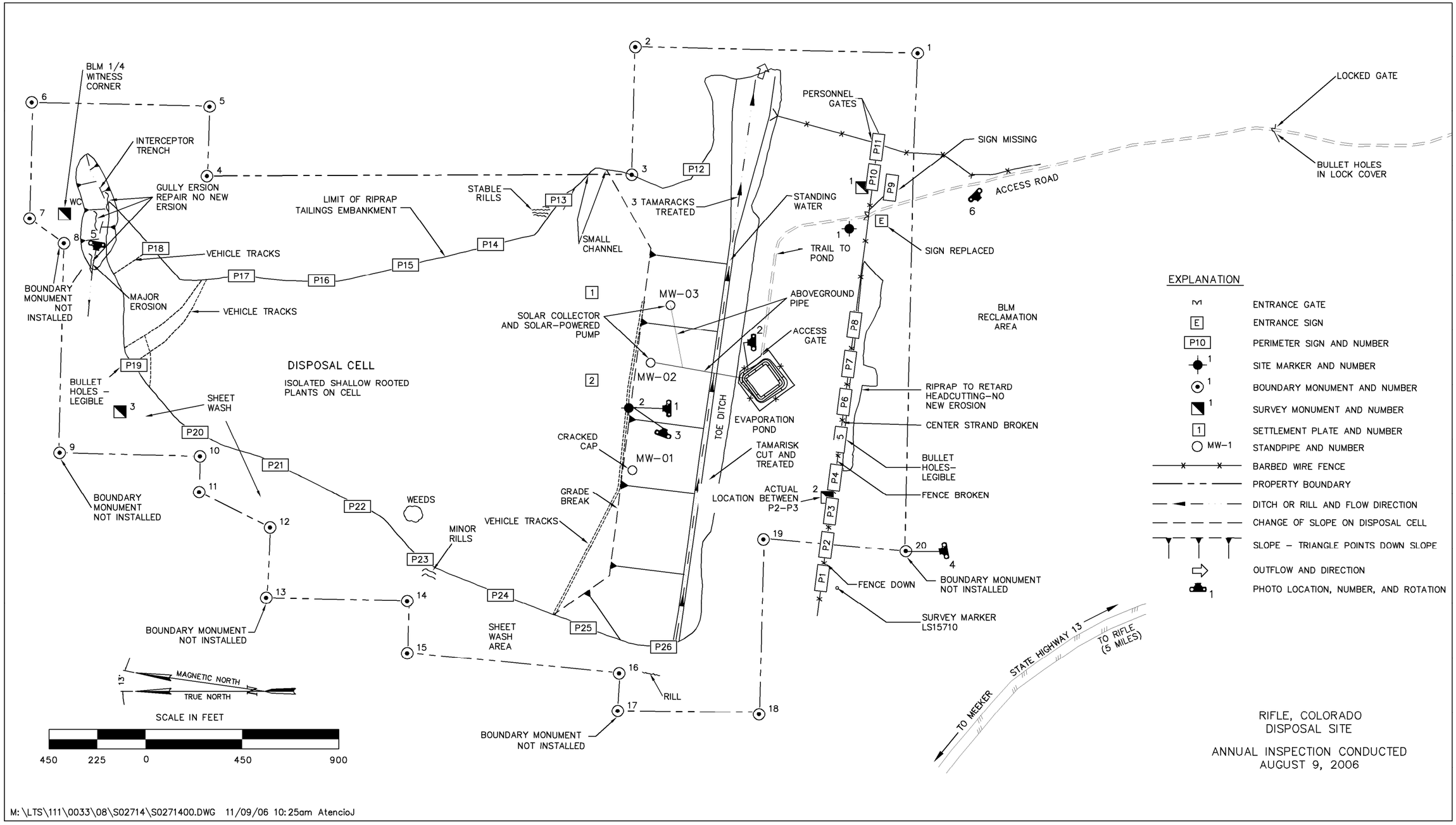


Figure 14–1. 2006 Annual Compliance Drawing for the Rifle, Colorado, Disposal Site

fluctuations. Information from this instrumentation is transmitted via cellular telephone technology to an internet connection where the data can be retrieved. These two standpipes have solar-powered pumps (PL–2) that discharge water through small-diameter aboveground plastic pipelines to a lined evaporation pond. The solar collectors are designed to automatically follow the position of the sun for optimal performance. There is no datalogger or pump in MW–01 because it is too shallow and usually dry. Water level data collected from these two standpipes are presented below in Section 14.3.4.

Evaporation Pond—An evaporation pond was constructed in 2001 to receive water pumped from standpipes MW–02 and MW–03. A datalogger, also with a remote data transfer system, is installed in the evaporation pond to measure water level fluctuations. The lined pond, surrounding security fence, and locked fence gate were in excellent condition (PL–3).

14.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the top of the disposal cell and interceptor trench; (2) the toe ditch and toe ditch outlet; (3) reclaimed areas; and (4) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Disposal Cell and Interceptor Trench—Rock armor covering the 71-acre disposal cell was in excellent condition (PL–4). No evidence of subsidence, differential settlement, or slumping was found.

In November 2005, due to an apparent slight inclination of the standpipes that suggested possible movement of the cell, the eight settlement plates were resurveyed (previously surveyed in 1997), along with the standpipes. Results of this survey indicated that the stickup sections of the standpipes (about 36 inches) were inclined up to 5 degrees down slope. No record of the original inclination of the standpipes can be found in site records, and it is presumed that the standpipes were vertical when installed. Neither the standpipes nor the settlement plates were found to display any lateral movement since they were installed in 1996; however, a minor drop in the elevation of the settlement plates (up to 0.46 ft) was reported, indicating settlement may have occurred. This amount of settlement is not unexpected considering that a significant amount of wet tailings were placed in the disposal cell and removal of pore water from the cell has occurred since construction. The reported lack of lateral movement suggests that the pile has not moved over the past 10 years. Survey of these features will be continued annually for the next several years.

A revegetated interceptor trench was constructed at the top of the disposal cell to protect the cell from storm-water and snowmelt run-on. The trench diverts water to the arroyo west of the site. Significant erosion occurred during a major rain event in 2005 and repairs to the interceptor trench were considered necessary. Rocks were moved into the eroded channel and the erosion stabilized in November 2005. The area had no new erosion at the time of the 2006 inspection (PL–5). Monitoring of this trench will continue.

Treatment of noxious weeds on the south slope of the interceptor trench in 2004 remains effective. Noxious weeds were not found in 2005 or 2006.

Toe Ditch and Toe Ditch Outlet—A toe ditch runs along the downslope (south) edge of the disposal cell and is armored with the same rock that protects the disposal cell. The toe ditch diverts surface runoff from the disposal cell off-site to the east. Several tamarisk plants were found in the toe ditch and were cut and treated, along with a small area of Canada thistle found during the 2005 inspection. Plant encroachment is sparse and is not impairing the function of the toe ditch.

14C

Minor erosion, anticipated in the design, has occurred in the channel at the outlet below the toe ditch. Bedrock is now exposed at the outlet and rock placed at the bottom of toe ditch outlet is dropping into the eroding channel to protect it from further erosion. Comparison with a photograph taken at the same location during the 2003 inspection indicates that no new erosion had occurred. Monitoring of this area will continue.

Reclaimed Areas—Disturbed areas around the edges and south of the disposal cell were reseeded in 1996. The vegetation, primarily grasses, continues to be stressed due to several years of drought conditions; precipitation increases in both 2005 and 2006 is anticipated to improve conditions. There was no evidence of cattle grazing within the site boundaries during the past year.

Three arroyos are present in the reclaimed area south of the disposal cell. A rock apron was placed between the stock fence and the head-cuts in these arroyos to prevent headward migration toward the disposal cell. As erosion has migrated into the rock apron, the rock has dropped into the arroyos and effectively armored them from further erosion (self-armoring).

Rills noted during previous inspections in the vicinity of perimeter sign P13 were stable. However, the runoff collected by the rills flows along the interface between the riprap and the adjacent reclaimed soil area. The runoff has scoured a small channel that currently averages about one foot wide and less than one foot deep and has exposed some of the gravel bedding material. When compared with photos taken in recent years at this location, the channel was unchanged. This feature is not threatening the integrity of the disposal cell at this time; however, continued observation during subsequent site inspections is warranted.

The reclaimed area south of the disposal cell was disturbed by the construction of the evaporation pond. This area will be reclaimed again after the evaporation pond is decommissioned.

Outlying Area—The area beyond the site for a distance of 0.25 mile was visually inspected for signs of erosion, development, or other disturbance. The primary land use in the area is grazing and wildlife habitat. No activity or development was observed that might affect site integrity or the long-term performance of the disposal cell.

The revegetated area directly south of the disposal cell on BLM-managed land was inspected. During construction of the cell, DOE was granted a Right-of-Way Reservation Permit by the BLM to use this area for topsoil storage and other purposes. This area was seeded at the same

time as the disturbed areas adjacent to the cell on DOE-owned land. Approximately 16 acres of the area did not successfully revegetate and, late in 1999, BLM requested that DOE reseed this portion of the site. DOE disked and reseeded the 16 acres in October 2000. Due to drought conditions, and competition by cheatgrass, desirable plant species never became established, and the cheatgrass dominated plant cover between 2001 and 2004. In spring 2004, DOE sprayed the undesirable plants (cheat grass) that dominated the reseeded area. At the time of the 2004 inspection, the coverage of these plants was greatly diminished, but the continued drought had not allowed desirable vegetation to reestablish.

In 2005, a major effort was expended to reestablish desirable plants on the 16-acre area. The area was plowed and reseeded. Reclamation specialists visited the site in spring 2006 and noted that many of the desirable seeded species had germinated and that cover by cheatgrass had decreased dramatically. Following a dry hot summer, many of the desirable species that germinated did not survive which allowed annual weeds to take over the site. At the time of the 2006 inspection, annual weeds dominated plant cover throughout the 16-acre area (PL–6). The annual weed cover may provide shade and allow desirable perennial species to reestablish. No corrective action is recommended at this time and inspectors will continue to monitor plant composition in the area.

14.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

14.3.3 Routine Maintenance and Repairs

In 2006, DOE removed debris deposited on the access road, replaced the entrance sign, and cut and treated tamarisk plants on site.

14.3.4 Ground Water Quality Monitoring

Monitoring of ground water quality is not required at this site because ground water in the uppermost aquifer is of limited use and the disposal cell is geologically isolated from the first useable aquifer by approximately 3,800 feet of low-permeability siltstones, shales, and sandstones.

14.3.5 Disposal Cell Pore Water Level Monitoring

14D

DOE monitors pore water levels in the disposal cell at standpipes MW−02 and MW−03 installed at the down gradient end of the cell on the south side slope to ensure that water within the disposal cell does not rise above the design protection feature, which would occur at an elevation of 6,020 feet. Wet tailings were included with the materials disposed within the cell. Tailings material at the toe of the disposal cell was constructed against a berm or earthen embankment at the southern (downslope) end of the cell. Because of concern that transient drainage and surface infiltration might cause a surface expression (i.e.; seep) to develop, a liner was installed that

extends part way up on the inside of the embankment to an elevation of 6,020 feet. If water within the disposal cell were to rise above this elevation, it would overflow the liner and saturate the embankment. This condition could weaken the down slope end of the cell sufficiently to allow slumping to occur, and also could cause a contaminated seep to emerge on the south slope of the cell. Therefore, water level monitoring is performed and an action level for pumping when pore water levels reached an elevation of 6,016 feet was established in the LTSP.

As specified in the LTSP, when the water level in MW–02 and MW–03 first approached the action level for pumping, DOE initiated a procedure to lower the water level in the cell. Water levels were first observed to have slightly exceeded the action level in September 2000 recording an elevation of 6016.03 feet in MW–02 and 6016.27 feet in MW–03. An evaporation pond for this purpose was constructed in 2001 and a solar-powered pump was installed in MW–02 with a small-diameter aboveground plastic pipeline delivering water to the evaporation pond. Although water was being removed from the toe of the disposal cell, the rate of removal was not enough to lower the water level in the cell, as indicated by the water level having not decreased by the end of 2003. During this same time period the production (volume of water being extracted) from MW–02 had begun to decrease for unknown reasons. Fluctuations above and below the action level occurred between September 2000 and May 2003 with levels in excess of the action level reaching a maximum in March 2003 recording an elevation of 6,016.61 feet in MW–02 and 6,016.66 feet in MW–03. In December 2003, a solar-powered pump (similar to the one in MW–02) was installed in MW–03 and a plastic above-ground water line was plumbed into the existing water line to increase the amount of water being removed from the disposal cell and sent to the evaporation pond.

At the time of the 2004 inspection, the pump in MW–02 had been operating at about 1 gallon per minute (gpm) and the pump in MW–03 at about 4 gpm. In 2005 and 2006, at the time of the inspection, MW–02 was operating intermittently and producing little water, and MW–03 was producing an estimated 2 to 3 gpm. The solar collector for MW–03 was tracking the position of the sun for optimal performance, but the panel for MW–02 was not tracking as closely; still both appeared to be operational and in good condition. The small-diameter plastic surface water line to the evaporation pond was also in good condition. Cell dewatering continues with evaporation rates in the evaporation pond having kept up with the influent rates. Heavy precipitation in October 2006 caused some concern that the pumps would have to be shut off in order to avoid overtopping of the pond from occurring, but the remote monitoring showed the water level remained below the design capacity of the pond and the pumps were not shut off.

14E

As shown by datalogger measurements (Figure 14–2), over the past year during pumping water levels initially decreased sharply followed by a steadier continuous decline, only rising in correspondence to precipitation events. The water level elevation remained below 6,015 feet in both standpipes. Datalogger malfunction in MW–02 resulted in lost water level data from late August through late October (when the pumps were shut off); because water levels in this well historically have remained significantly below the action level, and also below the water levels recorded in MW–03, there was no concern that the action level had been exceeded. In support of this conclusion, the static water level measurements obtained in both standpipes MW–02 and MW–03 when the pumps were shut off on October 30, 2006, were below the action level. During this period of pumping (early June to late October), fluctuations in the water levels represent typical drawdown and recovery that occurs during pumping on/off cycles. The pumps were shut

off for the winter because of reduced evaporation rates and the threat of breakage from freezing of the surface waterlines.

Looking back to early November 2005 when the pumps were turned off for the winter, water levels increased to 6015 feet within a relatively short time and then very slowly increased over the winter toward the action level of 6016 feet. The water levels did not reach the action level before pumping was resumed in early June 2006.

To date, approximately 3.8 million gallons of water have been pumped from the disposal cell. This includes the volume pumped during construction of the disposal cell and the volume pumped since dewatering was initiated again in 2001. The rapid recovery of the water levels in the standpipes to approximately 6,015 feet after pumping is discontinued, and the slow recovery afterward toward the 6,016-foot action level over the next six months, suggests a large reservoir of water remaining in the disposal cell.

DOE intends to remove enough water from the disposal cell to lower water levels in the standpipes to below the 6,014-foot elevation. At that time, pumping will be stopped, and water levels will be monitored to ensure they remain at or below that elevation. If water levels again rise, pumping will resume.

14.3.6 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

The LTSP establishes that corrective action will be taken if the water level in the disposal cell reaches 6,016 feet in elevation. Corrective action was initiated late in 2001 with the installation of the evaporation pond and dewatering of the cell. This action has lowered the water level to an acceptable elevation and prevents water from overtopping the disposal cell liner. Dewatering of the cell continued in 2006 and will continue in 2007.

14.3.7 Photographs

Table 14–2. Photographs Taken at the Rifle, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	NA	Site marker #1 on top of the disposal cell.
PL–2	360	Standpipe MW–02 and associated solar collector for solar powered submersible pump.
PL–3	160	Evaporation pond directly south of the disposal cell.
PL–4	350	Disposal cell.
PL–5	280	Erosion control in interceptor trench completed fall 2005, no new erosion.
PL–6	225	BLM Right of Way Reservation area south of disposal cell; plowed and reseeded in 2005.

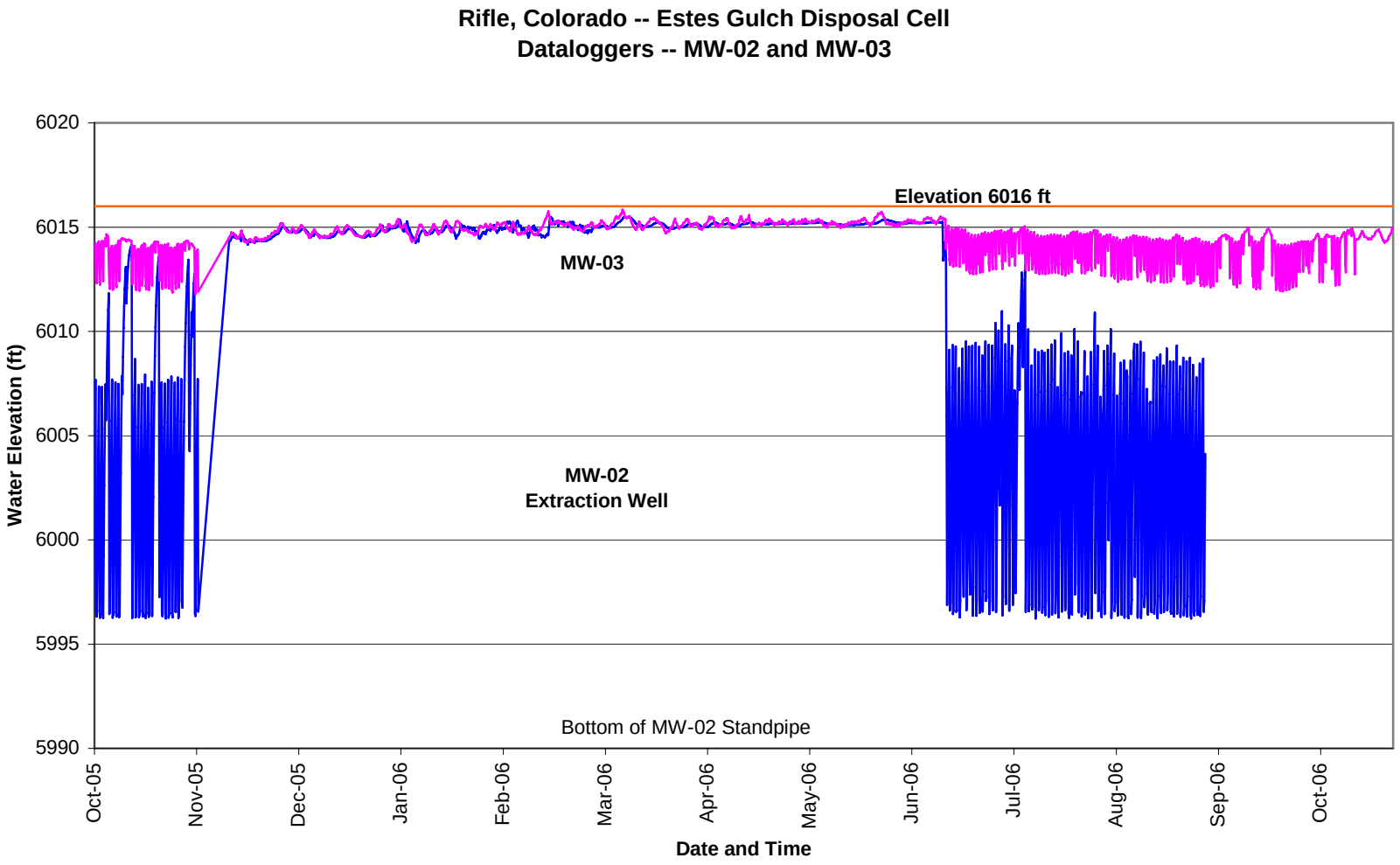
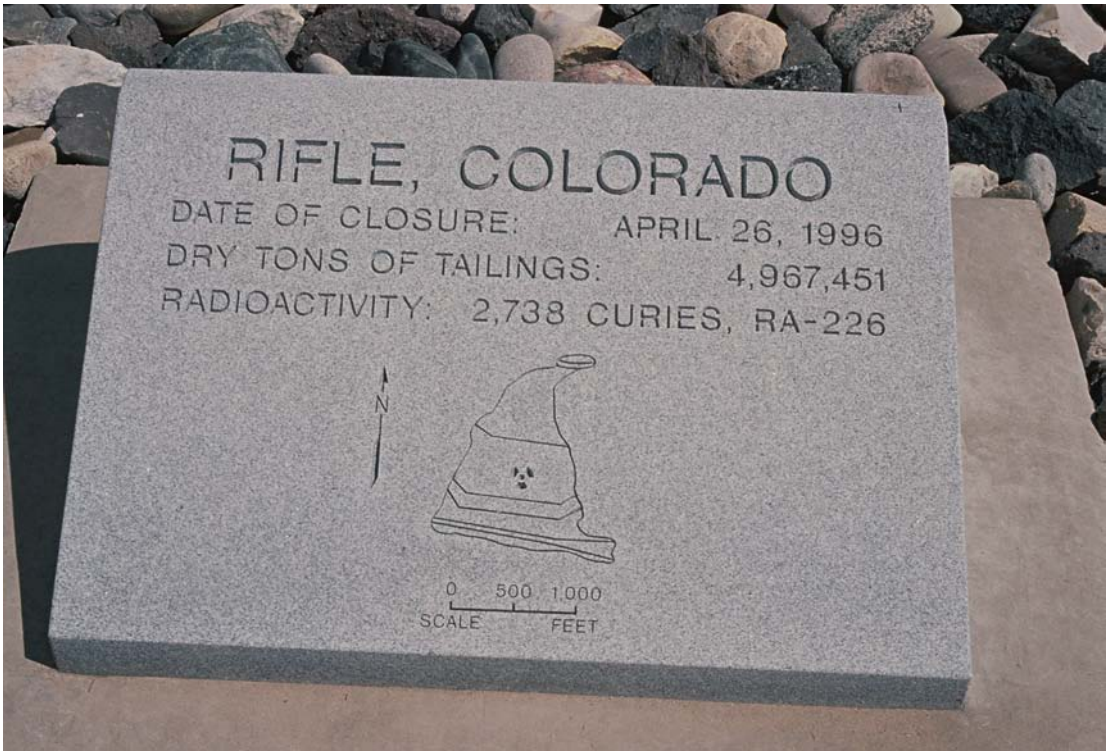


Figure 14−2. Disposal Cell Pore Water Levels in Standpipes MW−02 and MW−03 at the Rifle, Colorado, Disposal Site.



RFL 8/2006. PL–1. Site marker #1 on top of the disposal cell.

RFL 8/2006. PL–2. Standpipe MW–02 and associated solar collector for solar powered submersible pump.

RFL 8/2006. PL–3. Evaporation pond directly south of the disposal cell.

RFL 8/2006. PL–4.Disposal cell.

RFL 8/2006. PL–5. Erosion control in interceptor trench completed fall 2005, no new erosion.

RFL 8/2006. PL–6. BLM Right of Way Reservation area south of disposal cell; plowed and reseeded in 2005.

End of current section

15.0 Salt Lake City, Utah, Disposal Site

15.1 Compliance Summary

The Salt Lake City Disposal Site, inspected on April 4, 2006, was in good condition. The disposal cell, its cover materials, and associated surface water drainage features were in excellent condition. Because access to the site requires crossing an active radioactive waste disposal facility operated by Energy Solutions, Inc., (formerly Envirocare), personnel accessing the site must comply with Energy Solutions health and safety requirements. Energy Solutions personnel escort inspectors during the site inspection.

The excavated radiological contamination area identified on site in 2005 in the southwest corner of the property adjacent to an Energy Solutions waste haul road had been filled, but remained posted. All surface radiological survey measurements taken within the contamination area were below DOE Radcon Manual limits for posting a contamination area, and therefore, Energy Solutions was asked to de-post the area. All surface radiological scanning measurements taken to determine if spillover or windblown contamination was occurring on site from the adjacent Energy Solutions radioactive waste disposal activities were also below DOE Radcon Manual limits. A new access license agreement was developed by DOE and signed by Energy Solutions and DOE in June 2006. Ground water monitoring is not required at this site. There were no maintenance requirements or cause for a follow-up or contingency inspection.

15.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Salt Lake City, Utah, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the South Clive Disposal Site, Clive, Utah* (DOE/AL/62350−228, Rev. 2, U.S. Department of Energy [DOE], Albuquerque Operations Office, September 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 15–1.

Table 15–1. License Requirements for the Salt Lake City, Utah, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 15.3.1
Follow-up or Contingency Inspections	Section 3.4	Section 15.3.2
Routine Maintenance and Repairs	Section 5.0	Section 15.3.3
Ground Water Monitoring	Section 4.0	Section 15.3.4
Corrective Action	Section 6.0	Section 15.3.5

Institutional Controls—The 100-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1997. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

15.3 Compliance Review

15.3.1 Annual Inspection and Report

The site, located 85 miles west of Salt Lake City, Utah, was inspected on April 4, 2006. Results of the inspection are described below. Features and photograph locations (PL) mentioned in this report are shown on Figure 15–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

15.3.1.1 Specific Site Surveillance Features

Access Road, Fences, Gates, and Signs—Access to the Salt Lake City site is attained by following paved and graded roads to the Energy Solutions facility. All traffic entering the Energy Solutions facility is stopped at a security gate approximately 0.25 mile west of the DOE disposal site. Inspectors pass through this gate and must then sign in with Energy Solution's security guard in a building near the northwest corner of the disposal cell.

15A DOE has a perpetual easement across Energy Solutions property, but no longer has direct access to the northwest entrance of the site because of the presence of an active waste haul road. Due to Energy Solution's ongoing radioactive waste disposal activities on the surrounding property (PL–1), the adjacent haul roads used to access the DOE site are designated as restricted areas (radiological control areas), and therefore, access across these restricted areas is controlled by Energy Solutions. After being briefed by Energy Solutions health and safety personnel on the radiological hazards and controls, inspectors sign a radiological work permit and are issued dosimeters. Energy Solutions personnel escort the inspectors to the site and during the inspection. Access to the site is now along a new route to the southwest corner of the property.

A chain-link security fence owned and maintained by Energy Solutions is located on the site property boundary. A second chain-link security fence owned and maintained by DOE lies within the Energy Solutions fence on the east, west, and south sides. The north side has only one chain-link security fence along the property boundary that is maintained by DOE. Energy Solutions has an additional fence bordering their haul roads north and west of the site. All fences were in good condition.

Energy Solutions installed new entrance gates through their fence and DOE's fence at the southwest corner of the site in 2002. The DOE entrance gate was locked and in excellent condition. The former entrance gate at the northwest corner of the site was also locked and in good condition.

The entrance sign, located on the current entrance gate, was is excellent condition (PL–2). All perimeter signs were present and in good condition.

Site Markers and Monuments—Two granite site markers are placed at the site, one located at the site entrance in the northwest corner and one located on the disposal cell top; both were in excellent condition. Four boundary monuments are located on the property, one in each corner; all were in good condition.

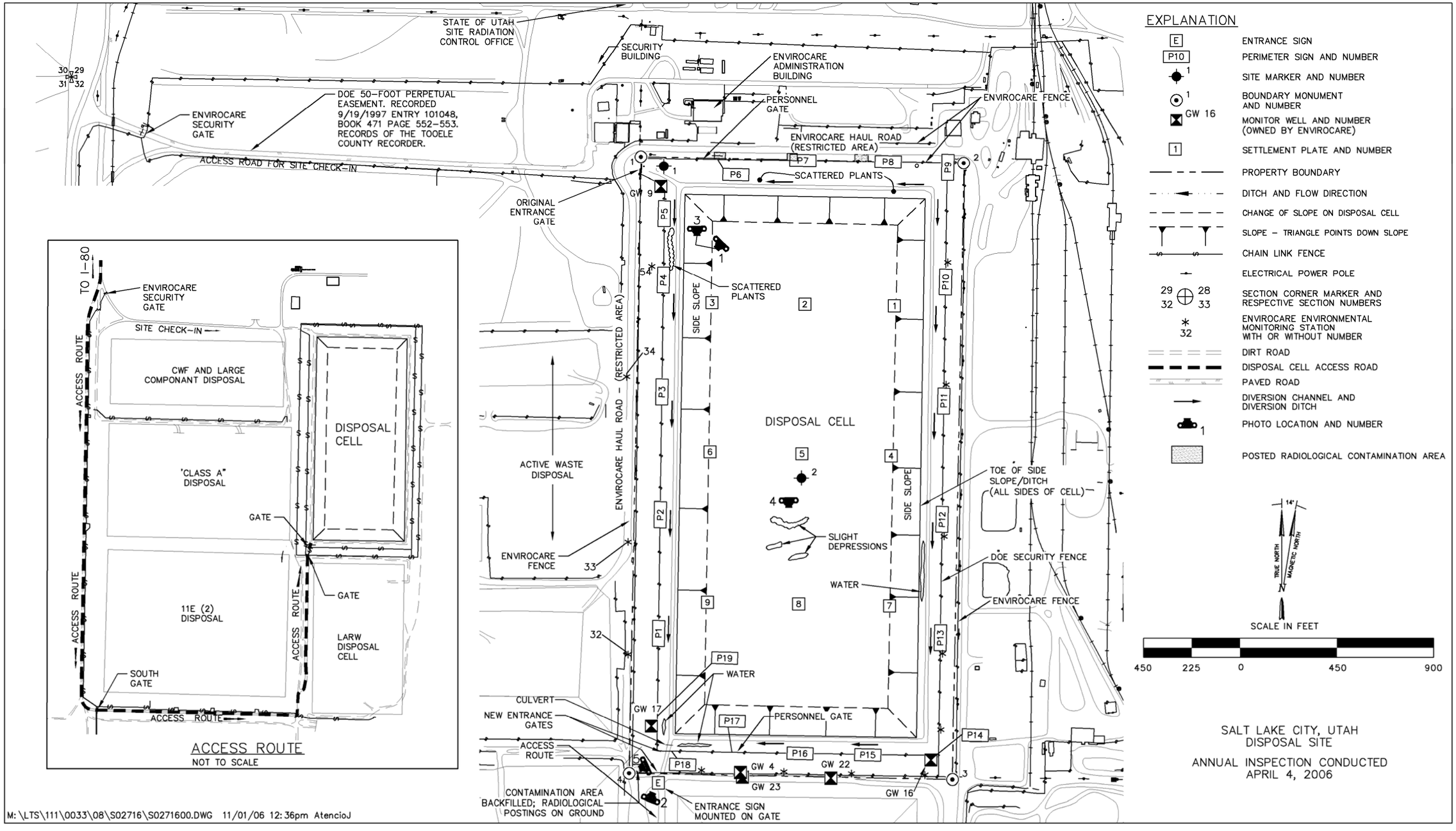


Figure 15–1. 2006 Annual Compliance Drawing for the Salt Lake (South Clive), Utah, Disposal Site

Monitor Wells—Ground water monitor wells are present within the site security fence, between the site security fence and the Energy Solutions property boundary fence, and on adjacent Energy Solutions property. All monitor wells on DOE property belong to Energy Solutions and are planned for abandonment by Energy Solutions under license agreement with DOE. A new
15B license agreement was developed and signed by each party in June 2006, which includes access onto DOE property for well abandonment. None of the wells had been abandoned at the time of the inspection, but all were properly secured.

15.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the top and side slopes of the disposal cell; (2) the area between the disposal cell and the site boundary; and (3) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Top and Side Slopes of the Disposal Cell—The top and side slopes of the disposal cell are armored with riprap and were in excellent condition (PL–3). Three very slight depressions were noted on the cell top (PL–4). These slight depressions are likely from the initial construction of the cell and had not been noticed previously; they currently do not present a problem and will continue to be monitored for settling. Inspectors found no evidence of settling, slumping, or instability on the top and side slopes of the disposal cell. No deep-rooted plants were found growing on the disposal cell cover.

Area Between the Disposal Cell and the Site Boundary—The area between the toe of the disposal cell and the site boundary was inspected. Water from recent precipitation was present in the toe drain along the southwest corner and the east side of the cell. All cell perimeter storm water diversion channels were in good condition. Minor plant encroachment has occurred in portions of the channels, however these plants do not degrade the function of the channels.

15C The radiological contamination area found during last year's inspection on DOE's property in the southwest corner of the site and adjacent to an Energy Solutions waste haul road, had been back-filled; however, the radiological barrier rope and warning sign had not been removed and were found lying on the ground (PL–5). Surface radiological survey measurements were taken within the contamination area. All measurements were below DOE Radcon Manual limits for posting a contamination area. The Energy Solutions escort was asked to have the area de-posted.

15D Cursory scanning for spillover and windblown radioactive contamination was performed on site during the inspection to determine if cross-contamination was occurring from the surrounding ongoing radioactive waste disposal activities being conducted by Energy Solutions. Scanning was also performed because posted radiological contamination areas were previously found both on DOE's property and directly adjacent to DOE's property. All surface contamination scanning measurements taken during the inspection were below DOE Radcon Manual limits, indicating spillover and windblown radiological contamination is not currently an issue onsite. Periodic scanning will be performed during future site inspections.

Outlying Area—This transect extends from the Energy Solutions fence to 0.25 mile beyond the site boundary. Energy Solutions managed low-level radioactive waste operations and activities surround the DOE property. East of the site incoming wastes are unloaded from rail cars and transferred to haul trucks. To the west is an active Class A low-level radioactive waste disposal cell and a large component waste disposal facility. Directly south is a completed low-level radioactive waste disposal cell. To the southwest is a disposal cell containing 11e(2) regulated low-level radioactive waste material. And, a mixed-waste treatment and disposal facility operates southeast of the site. All areas surrounding DOE's property are restricted due to radiological hazards.

In 2005, on the north side of the site between the DOE chain-link security perimeter fence (property boundary) and the Energy Solutions restricted area waste haul road fence, several locations were found during the inspection to have been excavated approximately one foot and posted as radioactive materials contamination areas. The contamination resulted from activity performed on the Energy Solutions waste haul road adjacent to the site. Energy Solutions removed the contaminated surface soil in these areas and installed matting on the waste haul road fence to help reduce future contamination. In 2006, these areas had not been back-filled or deposted; the barrier ropes and warning signs were observed lying on the ground (PL–7). Surface radiological survey measurements were taken on DOE's property just inside the perimeter fence and adjacent to these contamination areas. All measurements were below DOE Radcon Manual limits for posting a contamination area.

15.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

15.3.3 Routine Maintenance and Repairs

No routine maintenance or repairs were made at the site in 2006.

15.3.4 Ground Water Monitoring

The ground water under the site was determined to be of limited use because of excessive total dissolved solids concentrations in the uppermost aquifer. Consequently, the LTSP does not require ground water monitoring.

15.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

15.3.6 Photographs

Table 15–2. Photographs Taken at the Salt Lake City, Utah, Disposal Site

Photograph Location Number	Azimuth	Description
PL−1	225	Energy Solutions active waste disposal operations directly west of the site.
PL−2	20	Entrance sign and gate; disposal cell in background.
PL−3	180	Western portion of the disposal cell top showing west side slope of the cell.
PL−4	180	View south from SM2 attempting to show slight depressions in center portion of the disposal cell top.
PL−5	245	Previously excavated radiological contamination area in the southwest corner showing back-fill and fallen radiological barrier rope and posting.

SLC 3/2006. PL–1. Energy Solutions active waste disposal operations directly west of the site.

SLC 3/2006. PL–2. Entrance sign and gate; disposal cell in background.

SLC 3/2006. PL–3. Western portion of the disposal cell top showing west side slope of the cell.

SLC 3/2006. PL–4. View south from SM2 attempting to show slight depressions in center portion of the disposal cell top.

SLC 3/2006. PL–5. Previously excavated radiological contamination area in the southwest corner showing back-fill and fallen radiological barrier rope and posting.

16.0 Shiprock, New Mexico, Disposal Site

16.1 Compliance Summary

The Shiprock Disposal Site, inspected on June 8, 2006, was in excellent condition. The reconstructed drainage channel outlet was in excellent condition and continues to function as designed. Research associated with cell performance, including the collection of saturated hydraulic conductivity measurements, continued. Deep-rooted woody vegetation continues to encroach onto the side slopes and cover on the disposal cell, but is not affecting the performance of the cell. DOE continues to study the effect of plant encroachment on the cell to evaluate the need for ongoing vegetation control. Tumbleweeds and trash accumulated along the perimeter fence were removed and gaps beneath the perimeter fence were filled. No other maintenance needs or requirement for a follow-up or contingency inspection was identified.

16.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Shiprock, New Mexico, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Shiprock Disposal Site, Shiprock, New Mexico* (DOE/AL/62350–60F, Rev. 1, U.S. Department of Energy [DOE], Albuquerque Operations Office, September 1994) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 16–1.

Table 16-1. License Requirements for the Shiprock, New Mexico, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 16.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 16.3.2
Routine Maintenance and Repairs	Section 8.0	Section 16.3.3
Ground Water Monitoring	Section 5.0	Section 16.3.4
Corrective Action	Section 9.0	Section 16.3.5

Institutional Controls—The 105-acre disposal site is held-in-trust by the United States of America for the Bureau of Indian Affairs; the Navajo Nation retains title to the land. The site was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1996. DOE secured perpetual access to the site through a Custody and Access Agreement with the Navajo Nation. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal control of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

16.3 Compliance Review

16.3.1 Annual Inspection and Report

The site, located south of Shiprock, New Mexico, was inspected on June 8, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 16–1. Numbers in the left margin refer to items in the Executive Summary table.

16.3.1.1 Specific Site Surveillance Features

Access Road, Gates, Fence, and Signs— Access to the site is via a gravel road off U.S. Highway 491 and through a sand and gravel processing facility operated by the Navajo Engineering and Construction Authority (NECA) to the main entrance gate.

All three vehicle gates—the main entrance gate at the east corner of the site (near the terrace escarpment), the gate providing terrace access at the northwest corner of the site, and the old entrance gate at the west corner of the site—were locked and in good condition. A NECA lock is on the gate leading through the gravel pit area and forms a "daisy chain" with the DOE lock.

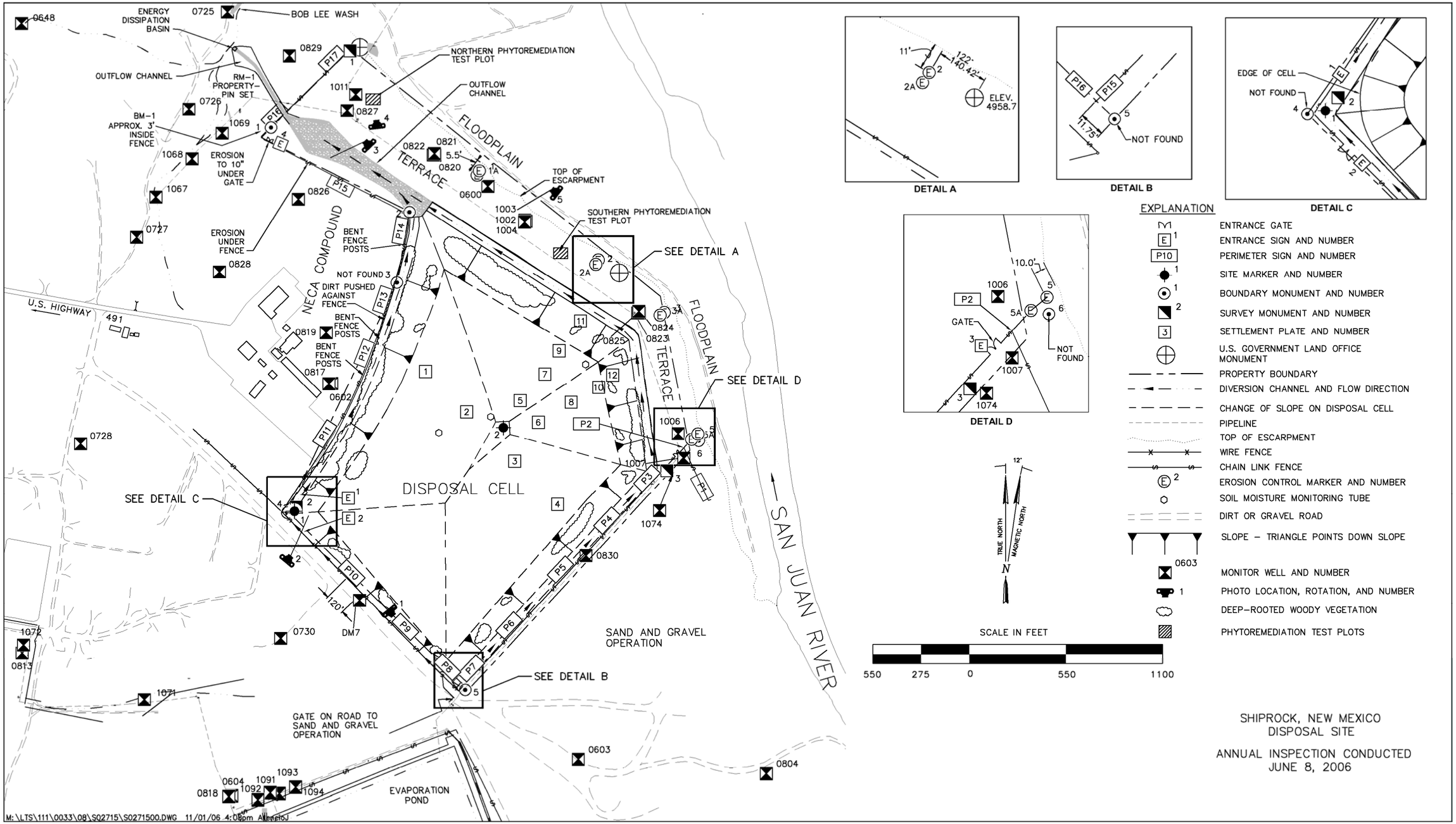
The chain-link security fence along the perimeter was in good condition except for several bent poles on the portion that borders the NECA yard. Bulldozing activity within the NECA yard has resulted in a pile of dirt being pushed up against the fence fabric near perimeter sign P13; this area will be monitored to ensure that the fence remains intact. Tumbleweeds and windblown trash that continue to accumulate along the perimeter fence on the southwest and northwest sides
16A of the property were removed (PL–1). Windblown sand deposits, removed in 2003, continue to accumulate along the southwestern portions of the perimeter fence. DOE will continue to monitor and remove significant tumbleweed, trash, and windblown sand accumulations.

16B A number of gaps beneath the fence, most formed by small animals, occur along the site perimeter. Several of these gaps were filled with rock during the inspection. These gaps are not a concern unless they are large enough to allow access by children, who live and play immediately west of the site. Inspectors will continue to monitor the number and size of these gaps and fill those that are large enough to provide human access.

Four entrance signs and seventeen pairs of perimeter signs are attached to the security fence. Each perimeter sign consists of one standard sign with text and one pictorial sign showing the disposal cell and displaying the Navajo symbol for danger. All other perimeter signs were intact and in good condition.

Site Markers and Monuments—Two site markers are placed at the site: one just inside the former main entrance at the west corner of the site and one on the disposal cell top. The two site markers were in good condition.

Three survey monuments and eight boundary monuments mark the site boundary. The three survey monuments were in good condition.



DETAIL A

DETAIL B

DETAIL C

DETAIL D

EXPLANATION

- ENTRANCE GATE
- ENTRANCE SIGN AND NUMBER
- PERIMETER SIGN AND NUMBER
- SITE MARKER AND NUMBER
- BOUNDARY MONUMENT AND NUMBER
- SURVEY MONUMENT AND NUMBER
- SETTLEMENT PLATE AND NUMBER
- U.S. GOVERNMENT LAND OFFICE MONUMENT
- PROPERTY BOUNDARY
- DIVERSION CHANNEL AND FLOW DIRECTION
- CHANGE OF SLOPE ON DISPOSAL CELL
- PIPELINE
- TOP OF ESCARPMENT
- WIRE FENCE
- CHAIN LINK FENCE
- EROSION CONTROL MARKER AND NUMBER
- SOIL MOISTURE MONITORING TUBE
- DIRT OR GRAVEL ROAD
- SLOPE – TRIANGLE POINTS DOWN SLOPE
- MONITOR WELL AND NUMBER
- PHOTO LOCATION, ROTATION, AND NUMBER
- DEEP-ROOTED WOODY VEGETATION
- PHYTOREMEDIATION TEST PLOTS

SCALE IN FEET

550 275 0 550 1100

SHIPROCK, NEW MEXICO
DISPOSAL SITE

ANNUAL INSPECTION CONDUCTED
JUNE 8, 2006

Figure 16–1. 2006 Annual Compliance Drawing for the Shiprock, New Mexico, Disposal Site

Eight boundary monuments are located at the site to define the site boundary. Several of these boundary monuments (BM–3, –4, –5, and –6) could not be located and may have been covered with windblown sand. BM–4 may have inadvertently been removed when windblown sand was bulldozed along the southwest perimeter fence in 2003, and BM–5 may have accidentally been removed when a ground water pipeline was installed in 2004. BM–7 was not inspected because it is on a steep slope along the escarpment, and BM–8 was not inspected because it is on the floodplain outside of the property. Boundary monuments BM–1 and BM–2 were in good condition.

The Bureau of Indian Affairs holds the land on which the disposal cell is situated in trust for the Navajo Nation. Because the land is not owned by DOE and the site lines of usage are clearly established by the security fence, the presence or exact location of boundary monuments is not a critical issue for managing the disposal site at this time. Should circumstances change in the future, and boundary monument locations become a critical issue, DOE will subcontract a licensed surveyor to find and/or reestablish the monuments.

Erosion Control Markers—Four sets of erosion control markers are set along the edge of the terrace escarpment. The four sets of erosion control markers were in good condition and were not threatened by erosion along the terrace escarpment.

Monitor Wells—Ground water monitoring is not required by the LTSP for this site. Monitor wells for ongoing ground water remediation activities, in and around the site, are not included in the annual inspection because the wells are visited frequently by staff supporting the ground water restoration activity.

16.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the disposal cell (including the riprap-covered top and side slopes, diversion channels, and outflow channel); (2) the terrace area north and northeast of the disposal cell; and (3) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Disposal Cell, Diversion Channels, and Outflow Channel—The top and side slopes of the cell, covered with rock riprap, were in good condition. No evidence of settling, slumping, or erosion was found.

Significant vegetation growth has been noted during past inspections on the cell top and the east, northeast, and northwest side slopes. These areas were sprayed with herbicide in 2001 and the larger shrubs again in 2004 in a continuing effort to reduce the seed source and control future plant encroachment on the disposal cell. Despite these efforts, the population of woody shrubs growing on the disposal cell continues to increase (PL–2). The major populations of small shrubs on the cell, which have increased since the 2005 inspection, are shown on Figure 16–1. DOE will

continue to monitor and control vegetation growth as necessary; no control was performed in 2006. DOE is continuing to study the effect of plant encroachment on the disposal cell in order to evaluate the need for ongoing vegetation control.

16C

Five small research pits are located on the disposal cell cover. These pits are associated with on-going research concerning cell performance, including the collection of saturated hydraulic conductivity measurements. They do not affect the performance of the cell cover.

16D

Diversion channels around the base of the disposal cell were in good condition. Tire tracks from a vehicle left ruts in the riprap along the northwest diversion channel; however, the ruts do not adversely affect the performance of the channel and are not a concern at this time. Site drainage is ultimately directed toward the outflow channel at the northwest corner of the site. The outflow channel and energy dissipation basin, reconstructed in 2003 after significant erosion damage occurred, were in good condition. Woody vegetation in the outflow channel was treated with herbicide in September 2004 and in 2005. Additional vegetation growth was observed in 2006 (PL–3). The need for additional herbicide applications to control woody vegetation will continue to be assessed; none was applied in 2006. Vegetation present in the diversion channels does not affect the performance of the channels.

Terrace and Site Perimeter—The terrace is the area north and northeast of the disposal cell between the cell and the escarpment, excluding the outflow channel. Four sets of erosion control markers are in place along the terrace escarpment. All markers were in good condition. Sloughing of the escarpment face, noted directly northwest of erosion control marker E1, is a natural but infrequent occurrence. The escarpment is more than 300 feet from the edge of the cell and the erosion poses no threat to the integrity of the cell. The erosional "pillar" that has separated from the edge of the escarpment showed no new movement in 2006. Inspectors will continue to monitor the stability of the escarpment.

16E

Two new test plots that demonstrate plants useful for phytoremediation have been started on the northeast side of the terrace (PL–4 and PL–5). The purpose of the test is to demonstrate the effectiveness of using phreatophytes for removing former processing-site legacy ground water contamination from the terrace. The experiment will last from 3 to 5 years.

Outlying Area—A sand and gravel pit operated by the NECA is located immediately southeast of the disposal cell. Gravel operations have had no apparent affect on disposal site security or integrity, and there were no indications of recent activity at the pit.

As part of on-going ground water remediation efforts at the Shiprock disposal site, DOE constructed an 11-acre lined evaporation pond in a former borrow area across the access road southwest of the disposal cell in 2002. A chain-link security fence encloses the area. Although the activities associated with the treatment of contaminated ground water at this site are not within the scope of the LTSP, the pond will be monitored for general condition and security during future inspections. At the time of the 2006 site inspection, there were no concerns or issues noted with this area.

16.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

16.3.3 Routine Maintenance and Repairs

In 2006, tumbleweeds and trash accumulated along the perimeter fence were removed, and gaps beneath the perimeter fence were filled in with rock.

16.3.4 Ground Water Monitoring

Ground water monitoring is not required at this site because of the hydrogeologic conditions that occur beneath the site: the upward hydraulic gradient within the deeper aquifer evident by the higher piezometric head and the presence of confining layers evident by the low permeability of the unweathered Mancos Shale on which the disposal cell is constructed. These hydrogeologic conditions will preclude movement of legacy site-related contamination within the artificial ground water system beneath the former tailings pile (current location of the disposal cell) into the deeper aquifers.

16.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

16.3.6 Photographs

Table 16–2. Photographs Taken at the Shiprock, New Mexico, Disposal Site

Photograph Location Number	Azimuth	Description
PL−1	140	Trash and tumbleweeds along southwestern portion of the perimeter fence.
PL−2	40	Vegetation on west side of cell.
PL–3	315	Vegetation in outflow area.
PL–4	355	Northern phytoremediation test plot.
PL–5	310	Southern phytoremediation test plot.

SHP 6/2006. PL–1. Trash and tumbleweeds along southwestern portion of the perimeter fence.

SHP 6/2006. PL–2. Vegetation on west side of cell.

SHP 6/2006. PL–3. Vegetation in outflow area.

SHP 6/2006. PL–4. Northern phytoremediation test plot.

SHP 6/2006. PL–5. Southern phytoremediation test plot.

17.0 Slick Rock, Colorado, Disposal Site

17.1 Compliance Summary

The Slick Rock, Colorado, Disposal Site was inspected on April 20, 2006, and was in excellent condition. Noxious weeds were sprayed with herbicide again in 2006, and the weed control effort has significantly reduced infestations on the site. Revegetation efforts on the two reclaimed permit areas have been successful and the Right-of-Way Reservation for the two areas has been closed. No cause for a follow-up or contingency inspection was identified.

17.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Slick Rock, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Burro Canyon Disposal Cell, Slick Rock, Colorado* (DOE/AL/62350−236, Rev. 0, U.S. Department of Energy [DOE], Albuquerque Operations Office, May 1998) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 17−1.

Table 17−1. License Requirements for the Slick Rock, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Sections 3.0 and 6.2	Section 17.3.1
Follow-up or Contingency Inspections	Section 3.4	Section 17.3.2
Routine Maintenance and Repairs	Section 4.0	Section 17.3.3
Ground Water Monitoring	Sections 2.5 and 2.6	Section 17.3.4
Corrective Action	Section 5.0	Section 17.3.5

Institutional Controls—The 62-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1998. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

17.3 Compliance Review

17.3.1 Annual Inspection and Report

The site, northeast of Slick Rock, Colorado, was inspected on April 20, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 17−1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

Specific Site Surveillance Features

Access Road, Gate, Fence, and Signs—Access to the site is off County Road T11; an improved gravel and dirt road maintained by San Miguel County. The road was in excellent condition at the time of the inspection.

The wire entrance gate is secured with a DOE lock. A wire stock fence surrounds the site and a reclaimed spoils pile area west of the site; it does not follow the DOE property boundary. The top and bottom strands are smooth wire to allow wildlife to pass over and under, and the middle two strands are barbed wire. Both the entrance gate and the stock fence were in excellent condition.

The entrance sign is located inside the stock fence just east of the entrance gate and was in excellent condition. Thirty-two perimeter signs, designated P1 through P32, are spaced at approximately 200-foot intervals around the site. The signs, attached to steel posts set in concrete, are 5 feet inside the site boundary. The signpost at perimeter sign P1 has a bullet hole; however, it remains sturdy. All other perimeter signs were in excellent condition.

Site Markers and Monuments—The two granite site markers, SMK–1 near the entrance gate and SMK–2 on the north-central part of the disposal cell, were in excellent condition.

Six boundary monuments define the corners of the site boundary, and three survey monuments are located along the fence line. All the monuments were located and were in excellent condition.

17.3.1.1 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the rock-covered top of the disposal cell including side slopes, key trench, and apron; (2) the area between the disposal cell and the site boundary including the stock pond, re-contoured and reseeded areas, and the stock fence; and (3) the outlying area including the spoils pile.

Within each transect, inspectors examined specific site surveillance features, such as survey and boundary monuments, signs, and site markers. Inspectors examined each transect for evidence of erosion, settling, slumping, or other disturbance that might affect site integrity or the long-term performance of the site.

Disposal Cell, Side Slopes, Key Trench, and Apron—The disposal cell was completed in 1996. The top of the disposal cell is roughly pentagonal, and the top and sides are covered with rounded cobble- and pebble-sized rock. No evidence of settling, slumping, or erosion was seen on any of the cell surfaces. At the base of the side slopes is a rock-filled key trench that encircles the disposal cell. South and downslope from the disposal cell, a rock-covered apron of riprap extends for 50 to 200 feet beyond the key trench. All rock and rock-covered features were in excellent condition.

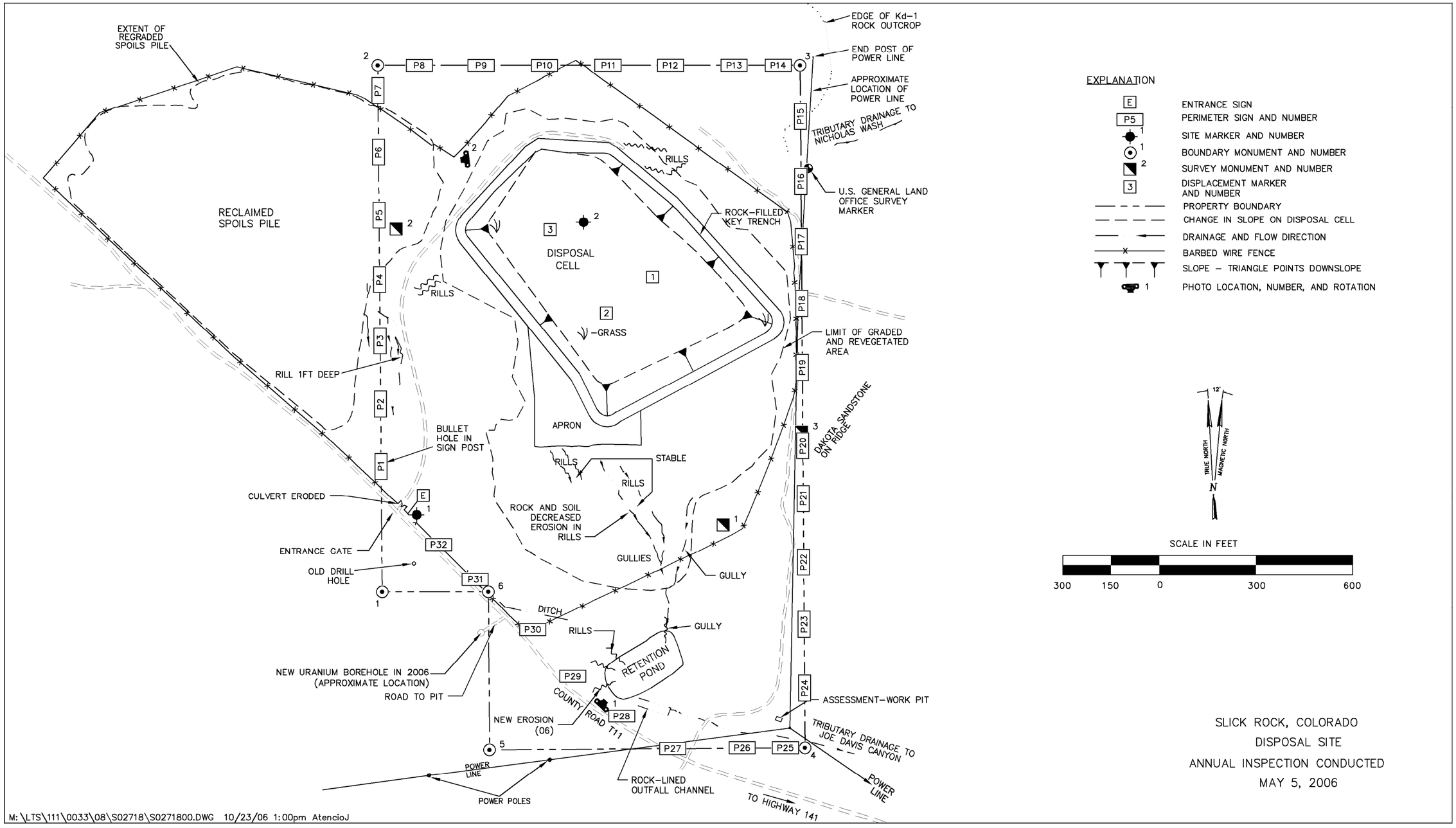


Figure 17–1. 2006 Annual Compliance Drawing for the Slick Rock, Colorado, Disposal Site

Area Between the Disposal Cell and the Site Boundary—The area around the disposal cell includes the retention pond and the graded and reseeded areas. Surface drainage from the disposal cell flows south into the retention pond, which is constructed in a channel tributary to Joe Davis Canyon. An outflow channel below the pond is lined with rounded cobblestones for a short distance. The pond, which was dry at the time of the inspection (PL–1), and outflow channel were in good condition. Evidence of erosion along the western side of the pond heading toward the access road was noted and will be monitored.

Areas of erosion between the apron and the retention pond and at the site entrance were repaired in 2004. The area downslope of the apron is stabilizing, but some erosion is still occurring at the upstream end of the culvert at the site entrance. However, access to the site is not impaired and maintenance is not required at this time. Some erosion is also occurring inside the west property boundary but currently is not impacting any site features.

17A DOE is controlling the noxious weeds Russian knapweed, halogeton, and bindweed on the site by applying herbicides. Infestations were mapped and sprayed again during the summer. Tamarisk was not found at the time of the inspection, indicating successful control efforts for that noxious plant.

Outlying Area—During construction of the disposal cell, material excavated from the site was placed in a 60-foot-high spoils pile on the west side of the site. A right-of-way permit, granted to DOE by the U.S. Bureau of Land Management (BLM), encompasses the spoils pile and the former staging area adjacent to the site entrance. The permit allowed DOE temporary access across and use of BLM-managed land for construction activities. One of the stipulations of the permit requires DOE to successfully revegetate these areas.

During a site inspection in 2001, BLM did not consider either of the areas successfully revegetated because of the lack of plant cover, abundance of weeds, and presence of erosional features. In September 2001, DOE regraded the slopes of the spoils pile to reduce and reshape them to more natural contours in order to control erosion. After regrading, the spoils pile and former staging area were ripped on the contour and seeded with native vegetation. These regraded areas have been monitored annually for revegetation success and erosional features. Observations during the 2006 inspection indicated progressive improvement of the vegetative
17B cover and no significant erosion (PL–2). DOE and BLM representatives inspected the reclaimed areas in October 2006, and BLM determined that the revegetation efforts were successful and closed out the Right-of-Way Reservation (document Serial No. COC–57851). DOE will remove the fence surrounding the spoil pile area and relocate it along the west property boundary.

The Kd-1 sandstone unit, which crops out near the northeast corner of the property, was identified in the LTSP as a potential pathway of lateral migration of transient drainage from the disposal cell. There was no evidence of moist soil, mineralization, or phreatophyte vegetation that would indicate that drainage is occurring along this interface.

The natural, undisturbed areas outside the disposal site support grass and scattered piñon and juniper trees. The primary land use is grazing. Steep hillsides north and northeast of the site slope eastward into Nicholas Wash. Areas north and northeast of the site are routinely used for

recreational purposes (e.g., hunting, four-wheeling, firewood cutting, etc.). No new disturbances in the outlying areas were noted at the time of the inspection.

17C A new uranium drill hole was discovered just outside of the site boundary between boundary monuments BM–5 and BM–6 along the southwest side of the site. U.S. Energy Corporation drilled the hole in April 2006. This area contains reserves of uranium and vanadium; therefore, additional new mining activity may be expected in the future.

17.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

17.3.3 Routine Maintenance and Repairs

Noxious weeds found at the site were sprayed with herbicide in 2006.

17.3.4 Ground Water Monitoring

DOE does not monitor ground water at this site because there is no pre-existing contaminant plume at the disposal site and the uppermost aquifer is not a current or potential source of drinking water due to low yield.

17.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

17.3.6 Photographs

Table 17−2. Photographs Taken at the Slick Rock, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	45	Dry retention pond.
PL–2	265	Revegetated spoils pile west of the site.

SRK 4/2006. PL–1. Dry retention pond.

SRK 4/2006. PL–2. Revegetated spoils pile west of the site.

End of current section.

18.0 Spook, Wyoming, Disposal Site

18.1 Compliance Summary

The Spook, Wyoming, Disposal Site, inspected on June 20, 2006, was in excellent condition. Minor erosion occurring at several locations displayed little change from the previous year and will continue to be monitored and evaluated; erosion repairs are not necessary at this time. No maintenance needs or requirement for a follow-up or contingency inspection were identified.

18.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Spook, Wyoming, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Spook, Wyoming, Disposal Site* (DOE/AL/350215.000, Rev. 0, U.S. Department of Energy [DOE], Albuquerque Operations Office, January 1993) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These license requirements are listed in Table 18–1.

Table 18–1. License Requirements for the Spook, Wyoming, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 18.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 18.3.2
Routine Maintenance and Repairs	Section 8.0	Section 18.3.3
Ground Water Monitoring	Section 5.2	Section 18.3.4
Corrective Action	Section 9.0	Section 18.3.5

Institutional Controls—The 14-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1993. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property and warning/no trespassing signs placed along the property boundary; the site is not fenced. Verification of these institutional controls is part of the annual inspection.

18.3 Compliance Review

18.3.1 Annual Inspection and Report

The site, located in north central Converse County, Wyoming, was inspected on June 20, 2006. Results of the inspection are described below. Features and the photograph locations (PLs) mentioned in this report are shown on Figure 18–1. The number in the left margin of this report refers to items summarized in the Executive Summary table.

18.3.1.1 Specific Site Surveillance Features

Access Road and Signs—Access to the site, located northwest of Douglas, Wyoming, is via Highway 93 to County Road 31 onto the Hornbuckle Ranch road. Site access is maintained through perpetual easements across the Hornbuckle Ranch. The road to the site is graded and

hard packed. North of the Dry Fork of the Cheyenne River, the road narrows to a seldom-used dirt track. The track is not surfaced and may be difficult to use in wet weather. The road continues and enters the Hardy Ranch about 0.5 mile north of the site, and is the access route to the Bear Creek, Wyoming, UMTRCA Title II site.

The site is open range and unfenced. All 10 perimeter signs and one entrance sign were in place and legible. Several perimeter signs have bullet holes and perimeter sign P7 is slightly bent and the paint is cracked; however, there is no need for repairs at this time.

Site Markers and Monuments—The two site markers, eight boundary monuments, and three survey monuments are in excellent condition. In 2005, spalling concrete at the base of site marker SMK–1 was patched to prevent additional damage. During the inspection, this patched concrete was found to have cracked (PL–1). Additional repairs will be made in 2007. Wind has scoured soil from beneath the surface concrete collar around boundary monument BM–6 and perimeter sign P10; however, both features are stable.

18A

Monitor Wells—Ground water monitoring is not required at this site. DOE abandoned all monitor wells in October 2000 and closed out the permits.

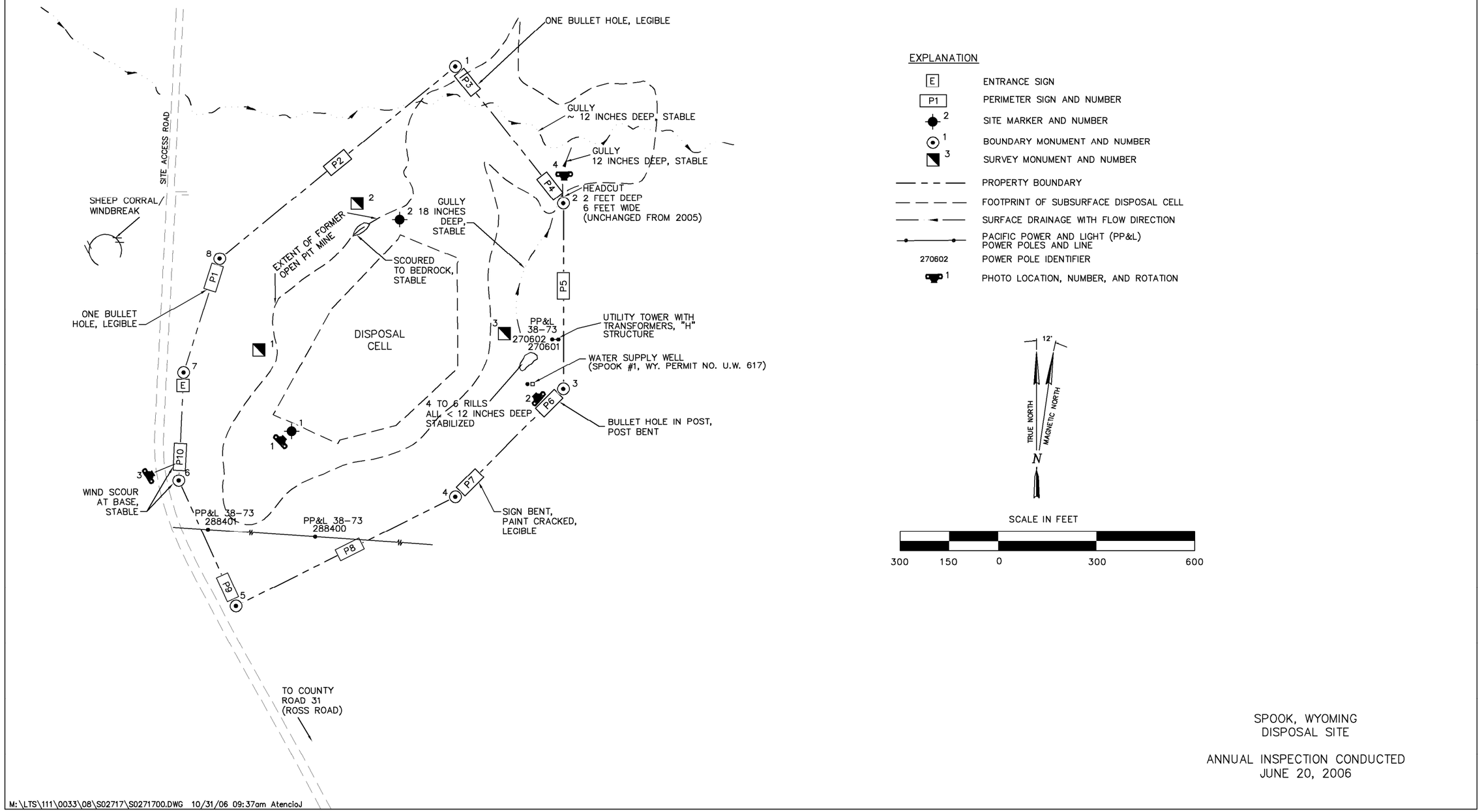
An old water supply well remains on the site (PL–2). The well, Spook #1 (Wyoming Permit No. U.W. 617), was installed in 1961 by the former landowner and predates site mining and milling activities. Well ownership was transferred to DOE when DOE acquired the site. It is completed in a deeper aquifer not affected by regional uranium mineralization and is permitted for 100 gallons per minute. DOE granted use of the well for agricultural and other purposes to Mr. Kirk Hornbuckle on behalf of Hornbuckle Ranch Limited Partnership, the owner of record of the surrounding ranch, through a perpetual access agreement (DE–RO13–02GJ67289). The agreement stipulates that users will hold DOE harmless from all liability associated with use of the well. The electricity meter has been removed, and there have been no indications of well use since inspections began.

18.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the disposal site; (2) the site perimeter; and (3) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes.

Disposal Site—The Spook site is unique among Title I sites in that tailings were encapsulated in the bottom of an open pit mine and covered with 40 to 60 feet of clean fill and topsoil. None of the observations and concerns routinely associated with above-grade disposal cells, such as quality of the riprap, stability of side slopes, or the presence of deep-rooted plants (biointrusion) above the radon barrier apply to this site.



EXPLANATION

- E — ENTRANCE SIGN
- P1 — PERIMETER SIGN AND NUMBER
- 2 — SITE MARKER AND NUMBER
- 1 — BOUNDARY MONUMENT AND NUMBER
- 3 — SURVEY MONUMENT AND NUMBER
- PROPERTY BOUNDARY
- FOOTPRINT OF SUBSURFACE DISPOSAL CELL
- SURFACE DRAINAGE WITH FLOW DIRECTION
- PACIFIC POWER AND LIGHT (PP&L) POWER POLES AND LINE
- 270602 — POWER POLE IDENTIFIER
- 1 — PHOTO LOCATION, NUMBER, AND ROTATION

SPOOK, WYOMING
DISPOSAL SITE

ANNUAL INSPECTION CONDUCTED
JUNE 20, 2006

Figure 18–1. 2006 Annual Compliance Drawing for the Spook, Wyoming, Disposal Site

The surface of the site, completed in 1989, was in excellent condition. No evidence of settling was observed over the former mine pit. Vegetation across the site, consisting of grasses and forbs, appears healthy and is indistinguishable from that which grows on the surrounding hills and valleys (PL–3). The same species are present and the overall health and density of vegetation are similar.

The site is not fenced, and the local landowner controls the grazing of cattle on DOE property as an extension of his ranching activities. Pronghorn antelope were observed grazing on the site at the time of the inspection. The range appears healthy and has not been overgrazed.

Pacific Power and Light Company (PP&L) owns a transmission line that crosses the southern end of the site. They also own three transformers on an aboveground platform near the water supply well to provide power for a down-hole pump.

Most erosion features observed during previous inspections within the property boundary have stabilized, as indicated by vegetation growing in the channels. A gully has scoured to bedrock in the northwest portion of the site, but this erosion feature appeared unchanged since the 2005 inspection and is not adversely impacting the site.

Site Perimeter—Inspectors walked the site perimeter. All as-built features were in good to excellent condition, as described above. If there were no perimeter signs along the boundary, the perimeter of the site would be very difficult to distinguish from the adjacent open range.

Most erosion features observed during previous inspections along and adjacent to the property boundary have stabilized. Only one gully, near perimeter sign P4, displays minimal activity and new vegetation continues to be establishing within the gully (PL–4). Monitoring of this erosion feature will continue until stabilization occurs and to ensure that perimeter sign P4 is not impacted.

The noxious weed Canada thistle had been found previously during inspections at the site, primarily along the site perimeter. Annual spraying has been conducted by the Converse County weed control agent. No Canada thistle or other noxious weeds were observed during the 2006 inspection, indicating the effectiveness of the weed-control efforts.

Outlying Area—The area beyond the site boundary for a distance of about 0.25 mile was examined for erosion, disturbance, change in land use, or other features of possible concern. No changes or concerns were noted.

18.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

18.3.3 Routine Maintenance and Repairs

No maintenance or repairs occurred at the site in 2006.

18.3.4 Ground Water Monitoring

Ground water in the uppermost aquifer at this site is contaminated as a result of widespread, naturally occurring uranium mineralization. The aquifer is of limited use due to marginal yield and because it cannot be cleaned up by methods reasonably employed in public water systems. Therefore, supplemental standards have been applied, and ground water monitoring is not required.

18.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

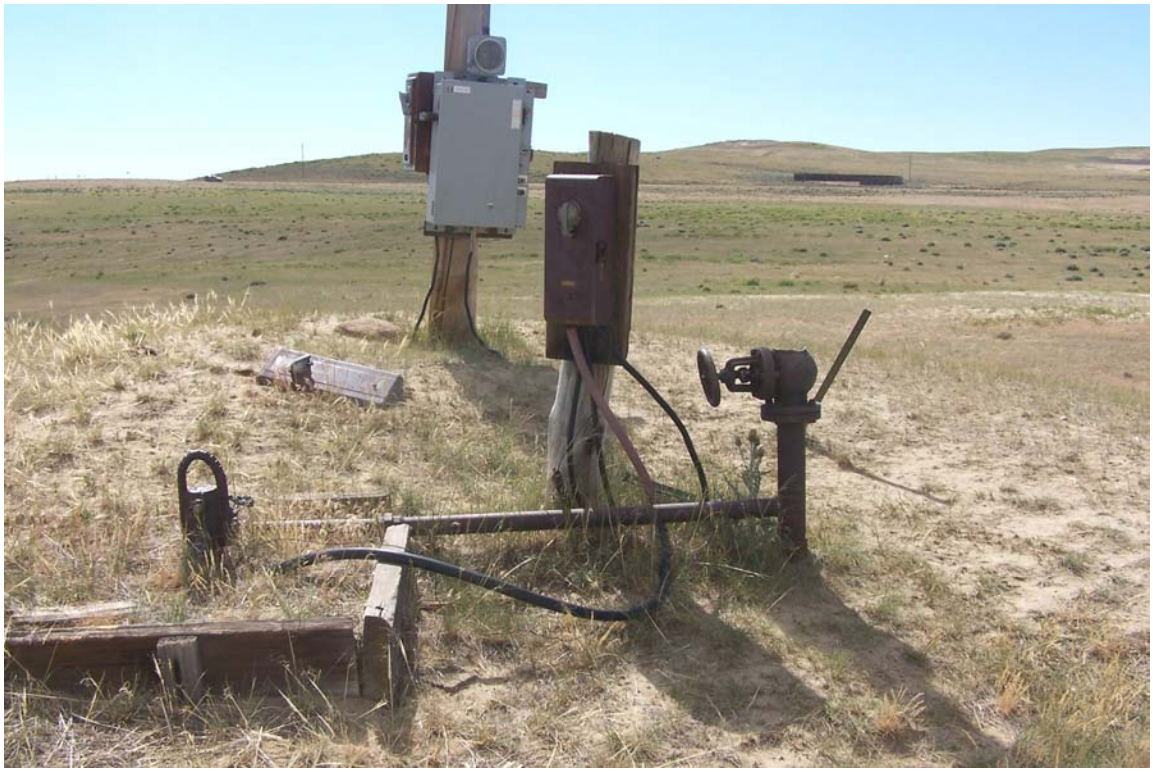
No corrective action was required at the site in 2006.

18.3.6 Photographs

Table 18–2. Photographs Taken at the Spook, Wyoming, Disposal Site

Photograph Location Number	Azimuth	Description
PL−1	40	Site marker SMK–1, showing cracking of patched concrete.
PL−2	310	Water supply well and PP&L power pole.
PL−3	60	View northeast across the disposal site from perimeter sign P10.
PL−4	190	Erosion near perimeter sign P4.

SPK 6/2006. PL–1. Site marker SMK–1, showing cracking of patched concrete.



SPK 6/2006. PL–2. Water supply well and PP&L power pole.

SPK 6/2006. PL–3. View northeast across the disposal site from perimeter sign P10.

SPK 6/2006. PL–4. Erosion near perimeter sign P4.

19.0 Tuba City, Arizona, Disposal Site

19.1 Compliance Summary

The Tuba City Disposal Site, inspected on April 27, 2006, was in good condition. The disposal cell, its cover, and associated drainage features were performing as designed. Sand accumulation at various locations along the toe of the disposal cell and in the drainage ditch and diversion channel was similar to last year and was not impacting the function of these features. The U.S. Department of Energy (DOE) continues to evaluate long-term effects of sand accumulation and the plant encroachment, particularly growth of deep-rooted plants, on the disposal cell and rock apron. Results of disposal cell ground water monitoring in 2006 indicate no significant change in ground water quality when compared to historical results. Small gaps found under the security fence and the southeast vehicle gate were filled. Separated sections of the top rail on the security fence were repaired. Deep-rooted vegetation was removed from the cell. No additional maintenance needs or cause for a follow-up or contingency inspection were identified.

19.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Tuba City, Arizona, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Tuba City, Arizona, Disposal Site* (DOE/AL/62350−182, Rev. 0, U.S. Department of Energy [DOE], Albuquerque Operations Office, October 1996) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 19–1.

Table 19–1. License Requirements for the Tuba City, Arizona, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.1	Section 19.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 19.3.2
Routine Maintenance and Repairs	Section 8.0	Section 19.3.3
Ground Water Monitoring	Section 5.2	Section 19.3.4
Corrective Action	Section 9.0	Section 19.3.5

Institutional Controls—The 145-acre disposal site is held in trust by the United States of America for the Bureau of Indian Affairs; the Navajo Nation retains title to the land. DOE and the Navajo Nation executed a Custodial Access Agreement (CAA) that conveys to the federal government title to the residual radioactive materials stabilized at the repository site and ensures that DOE has perpetual access to the site. UMTRCA authorized DOE to enter into Cooperative Agreement (CA) (DE-FC04-85AL26731) with the Navajo Nation and the U.S. Nuclear Regulatory Commission (NRC) required it prior to bringing the site under the general license. The purpose of the CA was to perform remedial actions at the former processing sites. The site was accepted under the NRC general license (10 CFR 40.27) in 1996 for compliance with 40 CFR 192, Subpart A and is not yet licensed for compliance with Subpart B because of active ground water remediation ongoing at the site. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal

control of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

19.3 Compliance Review

19.3.1 Annual Inspection and Report

The site, located east of Tuba City, Arizona, was inspected on April 27, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 19–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

Many features and structures at the site, such as office buildings, evaporation ponds, water treatment plant, and a network of extraction and injection wells, are associated with ongoing active ground water remediation activities and are not addressed in the LTSP. The annual inspection does not include these features or structures.

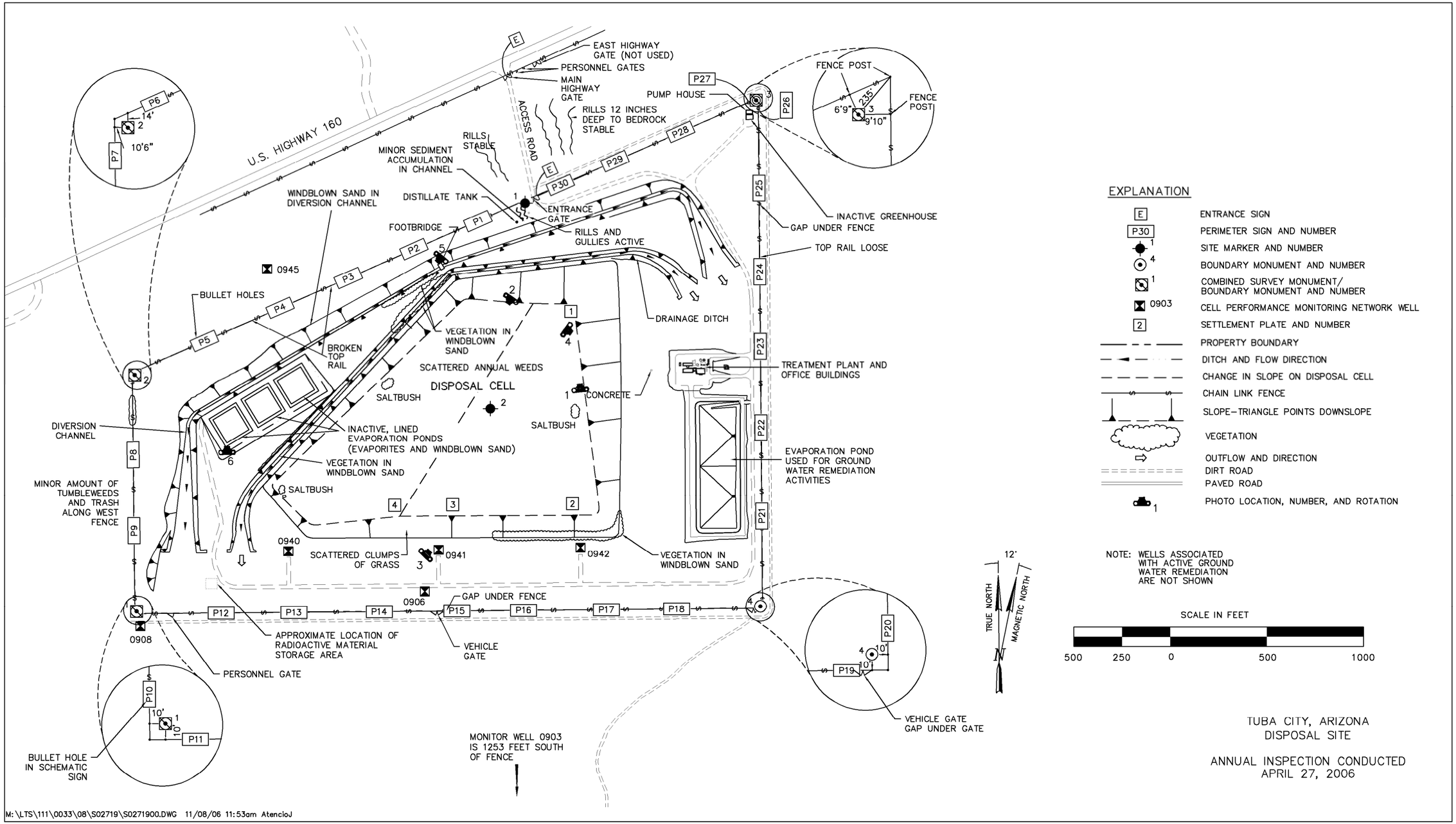
19.3.1.1 Specific Site Surveillance Features

Access Road, Fence, Gate, and Signs—A short, hard-packed graveled road leads from U.S. Highway 160 to the entrance gate in the fence along the north edge of the disposal site. The access road, access gate, entrance gate, and entrance signs to the site are in good condition.

The security fence around the site is chain link with three strands of barbed wire at the top. The fence is in good condition. Two burrows, probably dug by dogs, were noted during the inspection. Another gap was present under the vehicle gate located in the southeast corner of the site. These gaps were not considered to be a security concern because they were too small to allow unauthorized access into the site, but were filled with granular material. The top rail of the
19A perimeter fence was broken near perimeter signs P4 and P5 and loose near perimeter sign P24. These breaks were minor and did not compromise site security, but were repaired.

Two entrance signs and 30 perimeter signs are situated around the site. Perimeter signs are posted in pairs. Each sign pair, secured to a metal post and set back about 5 feet from the site boundary, consists of a "No Trespassing" sign with a radioactive materials tri-foil symbol and a schematic sign with a diagram of the disposal cell and the site boundary (that also includes the radioactive materials tri-foil symbol and lightening bolts which signify danger to the Navajo). Bullet holes are present in the "No Trespassing" sign at location P5, and in the schematic sign at P10; however, the signs are legible. Otherwise, the signs are in good condition.

Markers and Monuments—Two granite site markers, one just inside and to the right of the entrance gate and the other on top of the disposal cell, were in good condition. One boundary monument and three combined survey/boundary monuments mark the four corners of the site. Each monument is set back at various distances from the true corners of the site boundary. Windblown sand tends to accumulate and cover some monument locations. All monuments were inspected and found to be in good condition.



EXPLANATION

- ENTRANCE SIGN
- PERIMETER SIGN AND NUMBER
- SITE MARKER AND NUMBER
- BOUNDARY MONUMENT AND NUMBER
- COMBINED SURVEY MONUMENT/ BOUNDARY MONUMENT AND NUMBER
- CELL PERFORMANCE MONITORING NETWORK WELL
- SETTLEMENT PLATE AND NUMBER
- PROPERTY BOUNDARY
- DITCH AND FLOW DIRECTION
- CHANGE IN SLOPE ON DISPOSAL CELL
- CHAIN LINK FENCE
- SLOPE—TRIANGLE POINTS DOWNSLOPE
- VEGETATION
- OUTFLOW AND DIRECTION
- DIRT ROAD
- PAVED ROAD
- PHOTO LOCATION, NUMBER, AND ROTATION

Figure 19–1. 2006 Annual Compliance Drawing for the Tuba City, Arizona, Disposal Site

Monitor Wells— Seven wells comprise the cell performance monitoring network. The six wells inside and immediately adjacent to the disposal site were secure and in excellent condition. Monitor well 0903, located about one quarter mile south of the cell, was not inspected but is maintained by personnel performing the sampling and was reported locked and in good condition.

19.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the disposal cell; (2) the area between the disposal cell and the site boundary; and (3) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes.

Disposal Cell—The disposal cell is covered with riprap for erosion protection. The rock is in excellent condition and shows no signs of deterioration. No evidence of settling, slumping, or instability was observed on the top or side slopes of the disposal cell (PL–1). All visible components of the disposal cell and cover were functioning as designed.

Deep-rooted shrubs are removed from the cell periodically in accordance with the LTSP to prevent potential penetration of the radon barrier. The most recent shrub removal occurred during the fall of 2004 and the 2005 inspection. Several small shrubs were observed on the cell
19B during the 2006 inspection and removed. Grass and several patches of annual weeds were growing on the cell top and side slopes (PL–2); however, these shallow-rooted plants are not a concern.

For comparison and reference purposes, photographs of vegetation cover were retaken at established locations on the south side slope and toe drain to document annual changes in vegetation conditions and sand accretion at the site (PL–3). The 2006 photographs show there is very little change in vegetation conditions and sand accretion from the previous inspection, and no adverse effects to the performance of the cell have been observed. DOE continues to evaluate
19C the effects of vegetation encroachment and sand accretion on the cover, and to assess potential impacts to the radon barrier.

Area Between the Disposal Cell and the Site Boundary— Vegetation growth in the regraded areas adjacent to the disposal cell (inside the security fence) is comparable to vegetation conditions in surrounding undisturbed areas. However, ongoing ground water remediation activities continue to disturb small portions of these regraded areas. The disturbed areas will be monitored during annual inspections to ensure that revegetation progresses toward conditions typical of the surrounding plant communities.

A water treatment plant, an office building, evaporation ponds, a network of extraction/injection wells, a treated water infiltration system, and temporary fencing have been installed at the site (PL–4). These structures and facilities, part of ongoing operations associated with the active treatment of contaminated ground water from the former uranium processing that occurred at the

site, are not related to the long-term disposal and stabilization of encapsulated contaminated materials, and are not included as part of the annual site inspection process.

Two rock-lined drainage channels are located on the north (upslope) side of the disposal cell and are in good condition. The outermost channel intercepts storm water and diverts it around the disposal cell to the south and east. The inner drainage channel, constructed at the toe of the north and northwest sides of the disposal cell, collects runoff from the disposal cell itself and diverts it to the south and east as well. Sand accumulation in the inner diversion channel and in the northwest segment of the outer diversion channel displayed very little change since the 2005 inspection and does not interfere with the drainage function of the channels (PL–5).

Sand erosion and deposition are of particular concern at the site. Unstable dunes in outlying areas are likely to contribute to sand accumulation along fence lines, in diversion channels, and in the rock cover of the disposal cell. However, revegetation of remediated areas surrounding the disposal cell appears to have been successful in reducing the rate of sand accumulation on site. Tumbleweeds (dead Russian thistle) and windblown debris tend to accumulate along the fence lines and can cause windblown sand deposition to occur; no significant accumulations were observed during the 2006 inspection. Sand accretion and vegetation encroachment are checked annually in the diversion channels on the west, northwest, and north sides of the cell. No adverse effects to the performance of the cell or diversion channels have been observed.

Three inactive evaporation ponds are located between the diversion channels on the west side of the site. The ponds were dry at the time of the inspection. Evaporite and windblown sand deposits are present in all three ponds, with the greatest accumulation in the southwest pond (PL–6). The southwest pond is retained as a backup pond for the new evaporation pond located on the east side of the site. Removal of the inactive ponds is under evaluation.

19D

Several rills are present on the slope north of the diversion channel that is north of the disposal cell. This erosion deposits sediment into the diversion channel, but does not adversely impact the performance of the channel. Observation of this erosion will continue during the annual inspections.

A small temporary storage area for radiologically contaminated materials associated with the ground water remediation project is located in the southwest corner of the site. The storage area, located within the fenced property boundary, is surrounded by radiological warning rope and posted as a radioactive material area. Pumps and treatment equipment with fixed low-level contamination are temporarily stored on pallets and do not pose a risk of contaminating the underlying soil. Stored materials are periodically removed and disposed of at the Grand Junction Disposal Site located near Grand Junction, Colorado.

Outlying Area— The area beyond the site boundary for a distance of about 0.25 mile was examined for erosion, disturbance, change in land use, or other features of possible concern. No concerns were noted. Ground water remediation activities continue.

19.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2006.

19.3.3 Routine Maintenance and Repairs

In 2006, small gaps found under the security fence and the southeast vehicle gate were filled, and separated sections of the top rail to the security fence were repaired. Deep-rooted vegetation was removed from the cell.

19.3.4 Ground Water Monitoring

19E

DOE monitors ground water, as required by the LTSP, to compare current conditions to baseline post-construction (disposal cell) water quality at the site. Ground water quality beneath and downgradient of the disposal cell has been degraded by contamination from former uranium processing activities. This pre-existing (legacy) processing-site related ground water contamination may mask any contamination potentially leaching from the disposal cell. Additionally, transient drainage resulting from the presence of wet tailings and slimes within the disposal cell may also occur that would not be reflective of cell performance. Therefore, the LTSP refers to cell performance monitoring as "evaluative monitoring" and notes that results will be difficult to evaluate and may not be indicative of cell performance. As a result, this ground water quality data will be evaluated in conjunction with the 40 CFR 192 Subpart B (i.e., pre-existing processing-site related contamination) remedy at the site.

In accordance with the LTSP, seven compliance wells (Table 19–2) are monitored for four target analytes—molybdenum, nitrate (as nitrogen), selenium, and uranium. In 40 CFR 192 Table 1 of Subpart A, the U.S. Environmental Protection Agency (EPA) has established maximum concentration limits (MCLs) for these analytes in ground water (Table 19–3). However, because of the pre-existing (legacy) processing-site related ground water contamination, the LTSP also provides provisional upper baseline limits to assess the results of evaluative monitoring against (Table 19–3). Time-concentration plots, beginning in 1998, for the four analytes are shown on Figures 19−2 through 19−5.

Table 19–2. Ground Water Monitoring Network at the Tuba City, Arizona, Disposal Site

Monitor Well	Hydrologic Relationship	Monitoring Frequency
MW−0903	Downgradient	Annually
MW−0906	Downgradient	Semiannually
MW−0908	Downgradient	Semiannually
MW−0940	Downgradient	Semiannually
MW−0941	Downgradient	Semiannually
MW−0942	Downgradient	Semiannually
MW−0945	Upgradient	Annually

Table 19–3. Maximum Concentration Limits and Provisional Upper Baseline Limits for Ground Water at the Tuba City, Arizona, Disposal Site

Constituent	MCL [a] (mg/L)	Provisional Upper Baseline Limits [b] (mg/L)
Molybdenum	0.1	0.14
Nitrate (as N)	10	311
Selenium	0.01	0.05
Uranium	0.044	1.171

[a] EPA MCLs as listed in 40 CFR 192 Table 1, Subpart A.
[b] Provisional upper baseline limits are provided in the LTSP (October 1996).
MCL = maximum concentration limit.
mg/L = milligrams per liter.

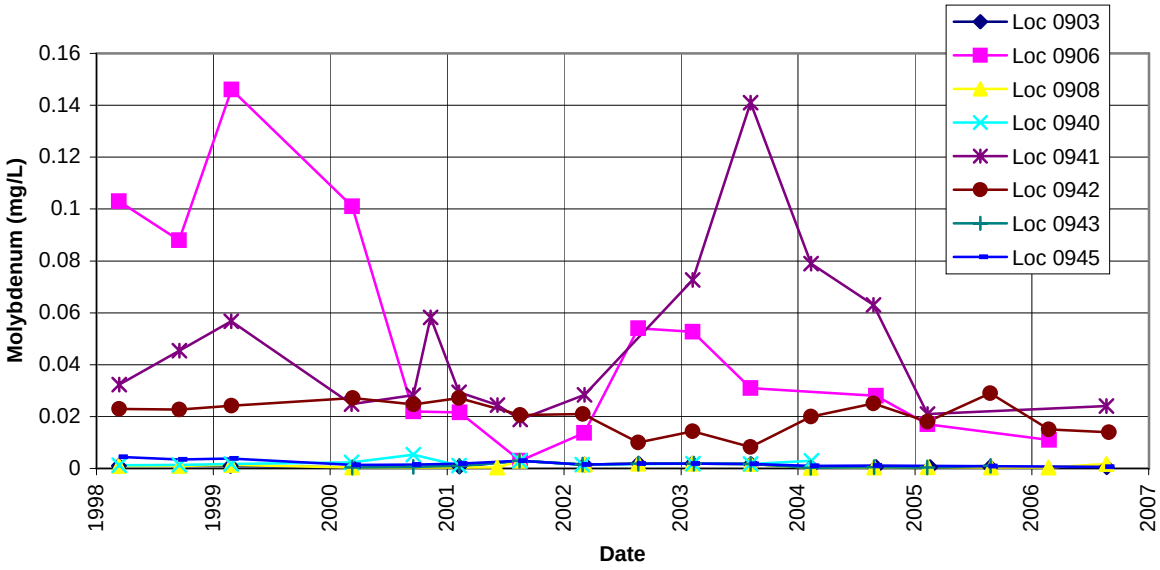


Figure 19–2. Time-Concentration Plots of Molybdenum in Ground Water at the Tuba City, Arizona, Disposal Site

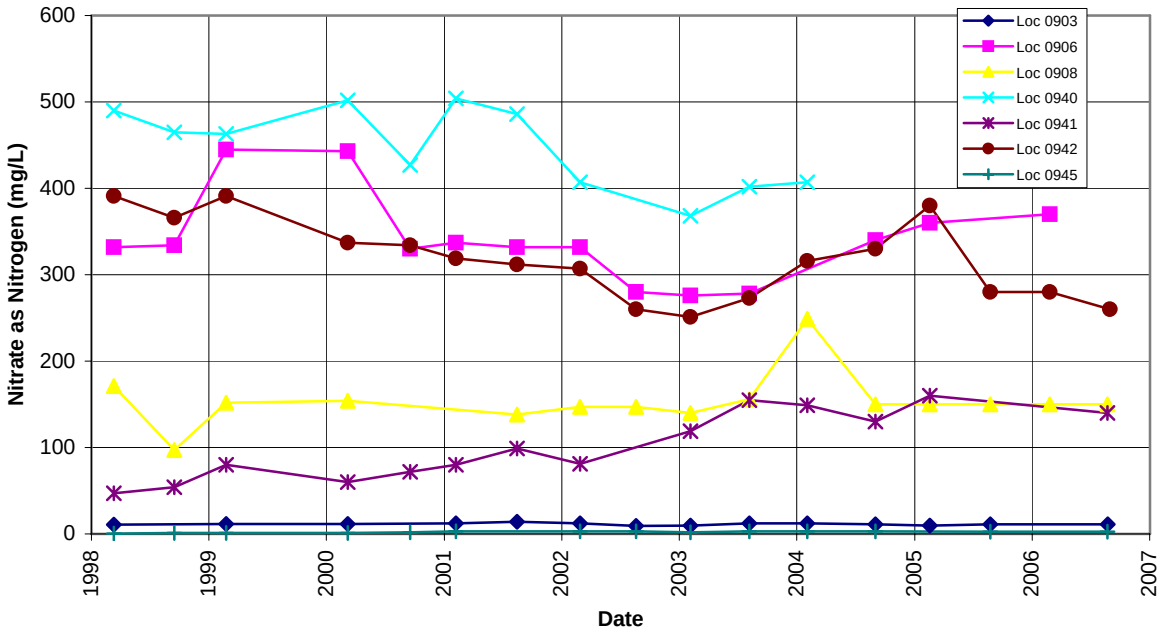


Figure 19–3. Time-Concentration Plots of Nitrate (as N) in Ground Water at the Tuba City, Arizona, Disposal Site

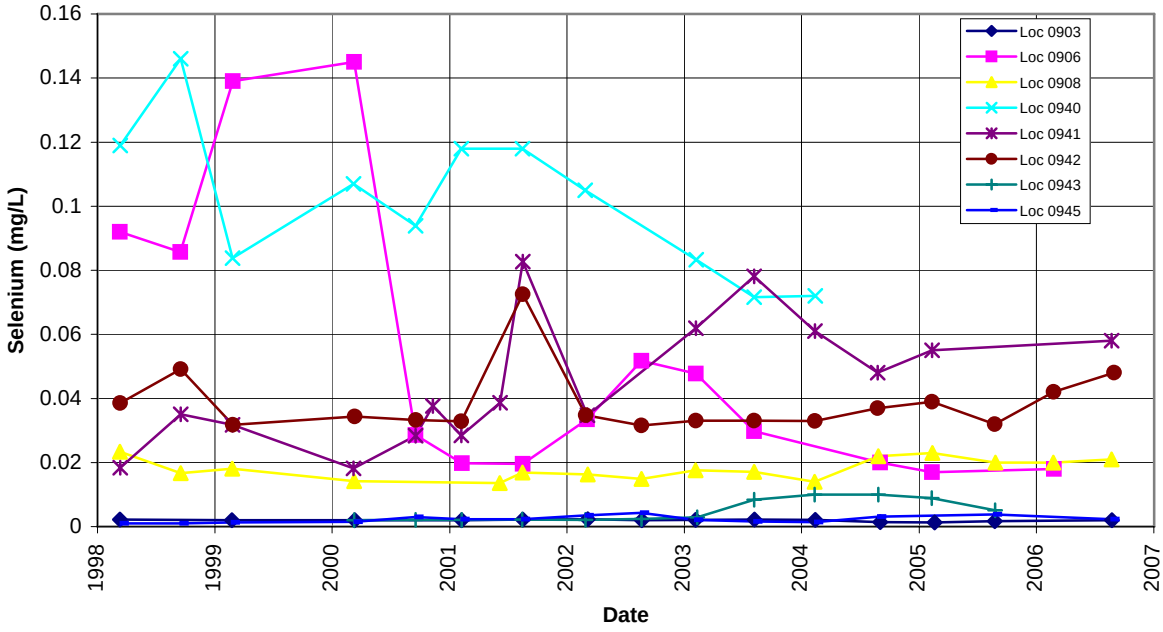


Figure 19–4. Time-Concentration Plots of Selenium in Ground Water at the Tuba City, Arizona, Disposal Site

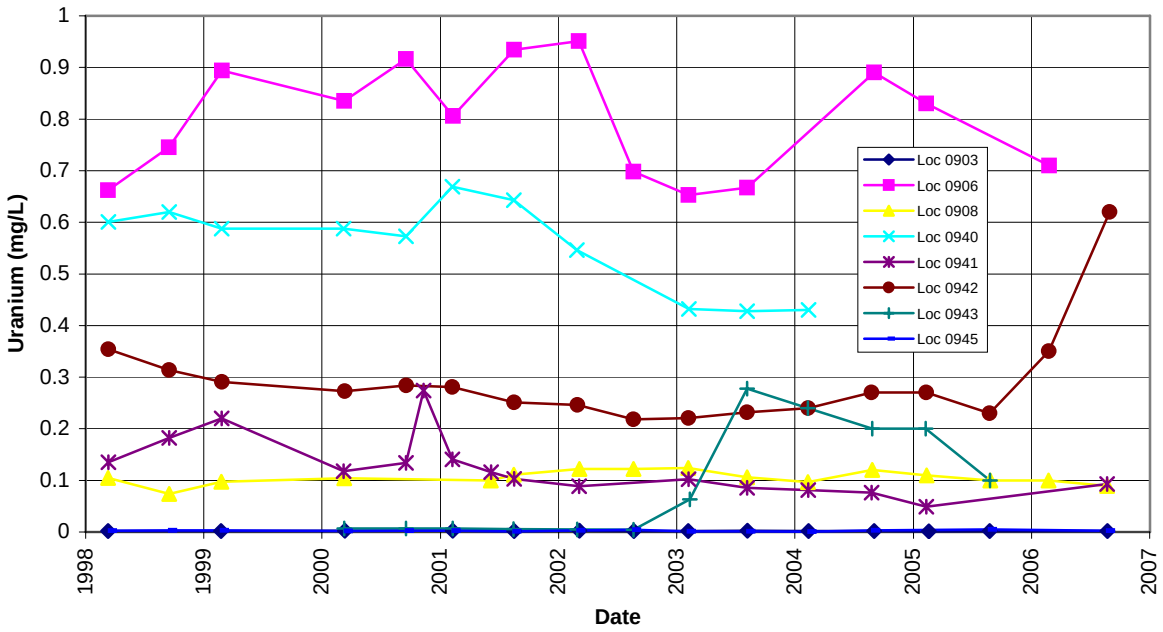


Figure 19–5. Time-Concentration Plots of Uranium in Ground Water at the Tuba City, Arizona, Disposal Site

Sample results from 2006 indicate that ground water quality downgradient from the former millsite is degraded with respect to all four target analytes as is consistent with historical data. Concentrations of all four target analytes in both the upgradient background well MW−0945 and the off-site (~1,250 feet) downgradient well MW−0903 remain significantly lower than all of the remaining on-site wells.

Molybdenum concentrations in ground water were below the MCL (0.01 mg/L) in 2006 in all wells (Figure 19–2). No significant variation from recent results occurred. Concentrations in onsite downgradient wells MW−0906 and MW−0941 fluctuated substantially since 1998; both above and below the MCL. Reported concentrations in these two wells have ranged from 0.01 mg/L to 0.15 mg/L in well MW−0906 and from 0.02 mg/L to 0.14 mg/L in well MW−0941. Overall, concentrations in well MW−0906 display a decreasing trend, whereas concentrations in well MW−0941 display a relatively flat trend line with the exception of an apparent anomalous spike that occurred between 2003 and 2005. The remaining locations have historically shown concentrations below 0.03 mg/L, and the upgradient background well MW−0945 and the off-site downgradient well MW−0903 continue at or near the detection limit.

Nitrate concentrations in ground water exceeded the MCL (10 mg/L) in 2006, by an order of magnitude or more, in all onsite monitor wells except the upgradient background well MW−0945 (Figure 19–3). No significant variation from recent results occurred. Historically concentrations in the off-site downgradient well MW−0903 have been close to the MCL and continue this trend in 2006. Concentrations in all wells have remained relatively consistent, except in MW−0941 where a slight upward trend seems apparent. Nitrate concentrations have varied considerably from well to well since 1998.

Selenium concentrations in ground water exceeded the MCL (0.01 mg/L) in 2006 in all wells except the upgradient background well MW−0945 and the off-site downgradient well MW−0903 (Figure 19–4). No significant variation from recent results occurred. Concentrations have remained fairly constant over time in two wells MW−0908 and MW−0942 (with one exception); the remaining on-site wells have fluctuated substantially since 1998.

Uranium concentrations in ground water exceeded the MCL (0.044 mg/L) in 2006 from all wells except the upgradient background well MW−0945 and the off-site downgradient well MW−0903 (Figure 19−5). No significant variation from recent results occurred, with the exception of well MW−0942 where results increased from 0.23 mg/L in August 2005 to 0.62 mg/L in August 2006. This recent increase is historically the highest concentration reported from this well; although, onsite downgradient well MW−0906 continues to report the highest concentrations that since 1998 have fluctuated between 0.65 mg/L to 0.95 mg/L.

Active ground water remediation is ongoing at the site. The LTSP "evaluative monitoring" cell performance wells are a subset of the ground water remediation monitoring well network. The progress of ground water remediation is evaluated annually, but remediation has not been active long enough to determine disposal cell performance.

19.3.5 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2006.

19.3.6 Photographs

Table 19–4. Photographs Taken at the Tuba City, Arizona, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	355	View north along the crest of the east side slope.
PL–2	215	Grasses and annual weeds on the disposal cell top.
PL–3	45	Vegetation encroachment on the south side slope of the disposal cell (reference photograph).
PL–4	125	Ground water treatment plant and evaporation pond east of the disposal cell.
PL–5	220	Sand accumulation and vegetation on the south bank of the diversion channel (reference photograph).
PL–6	360	Evaporite deposits in the southwest inactive evaporation pond.

TUB 4/2006. PL–1. View north along the crest of the east side slope.

TUB 4/2006. PL–2. Grasses and annual weeds on the disposal cell top.

TUB 4/2006. PL–3. Vegetation encroachment on the south side slope of the disposal cell (reference photograph).

TUB 4/2006. PL–4. Ground water treatment plant and evaporation pond east of the disposal cell.

TUB 4/2006. PL–5. Sand accumulation and vegetation on the south bank of the diversion channel (reference photograph).

TUB 4/2006. PL–6. Evaporite deposits in the southwest inactive evaporation pond.